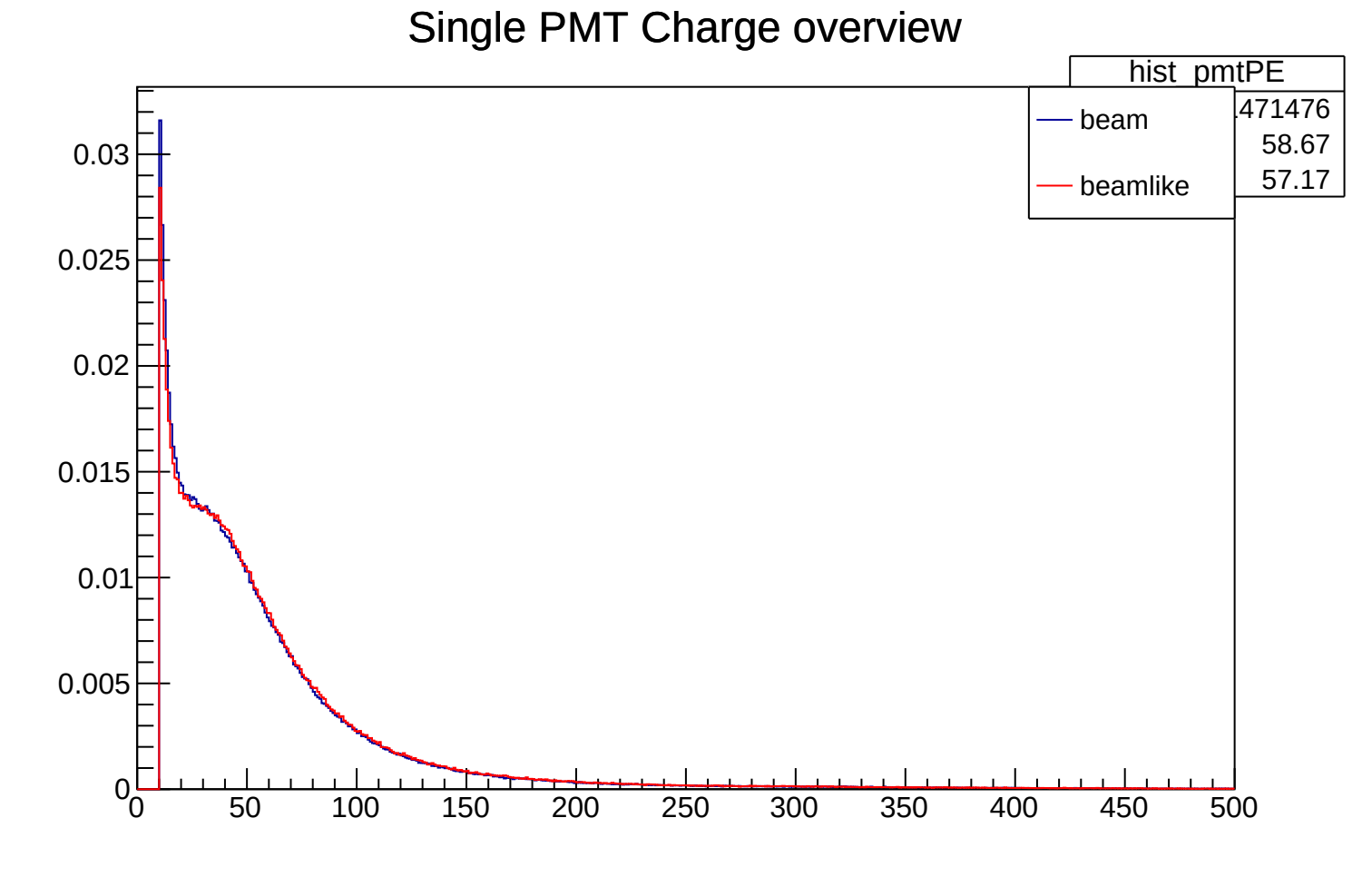
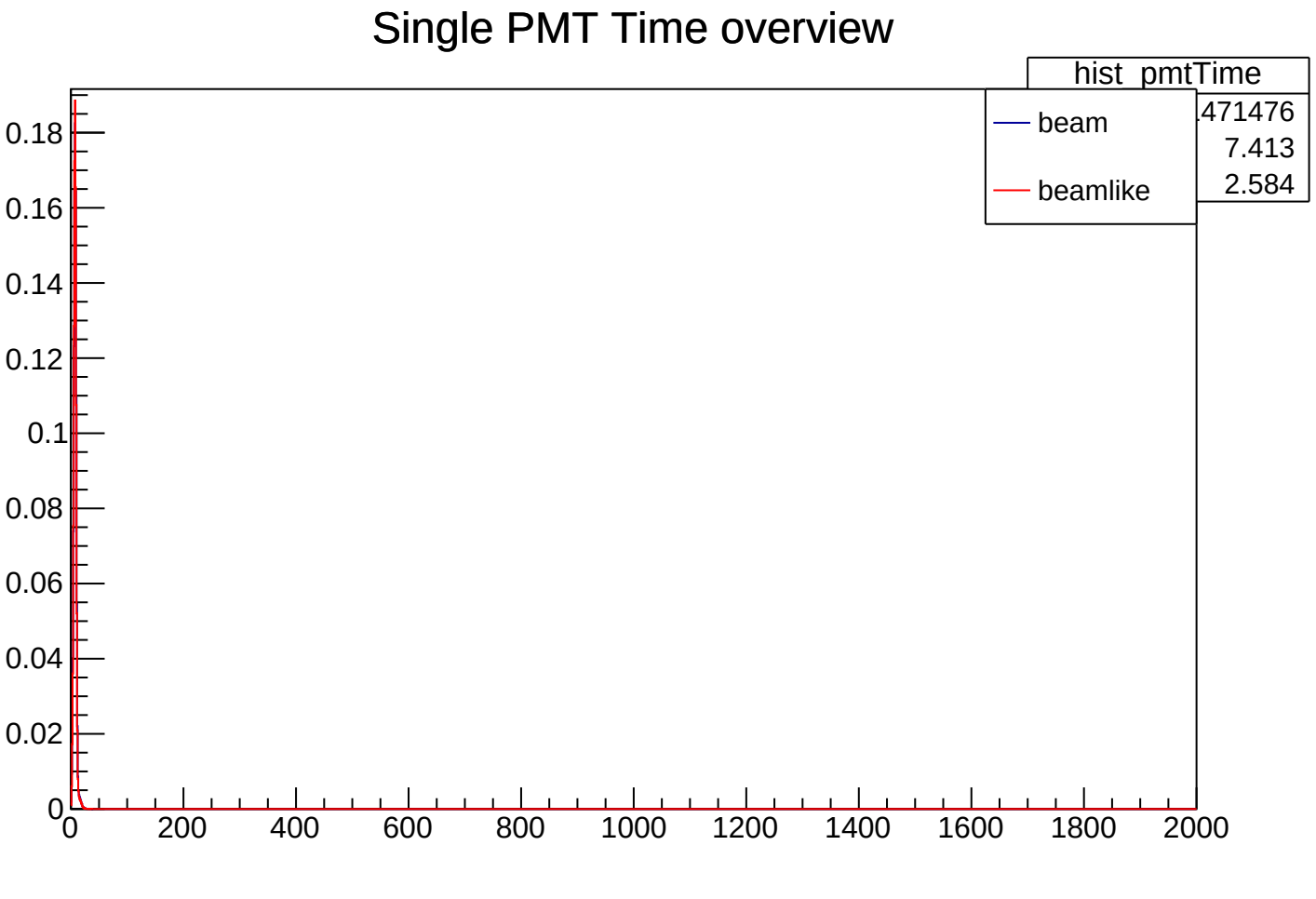
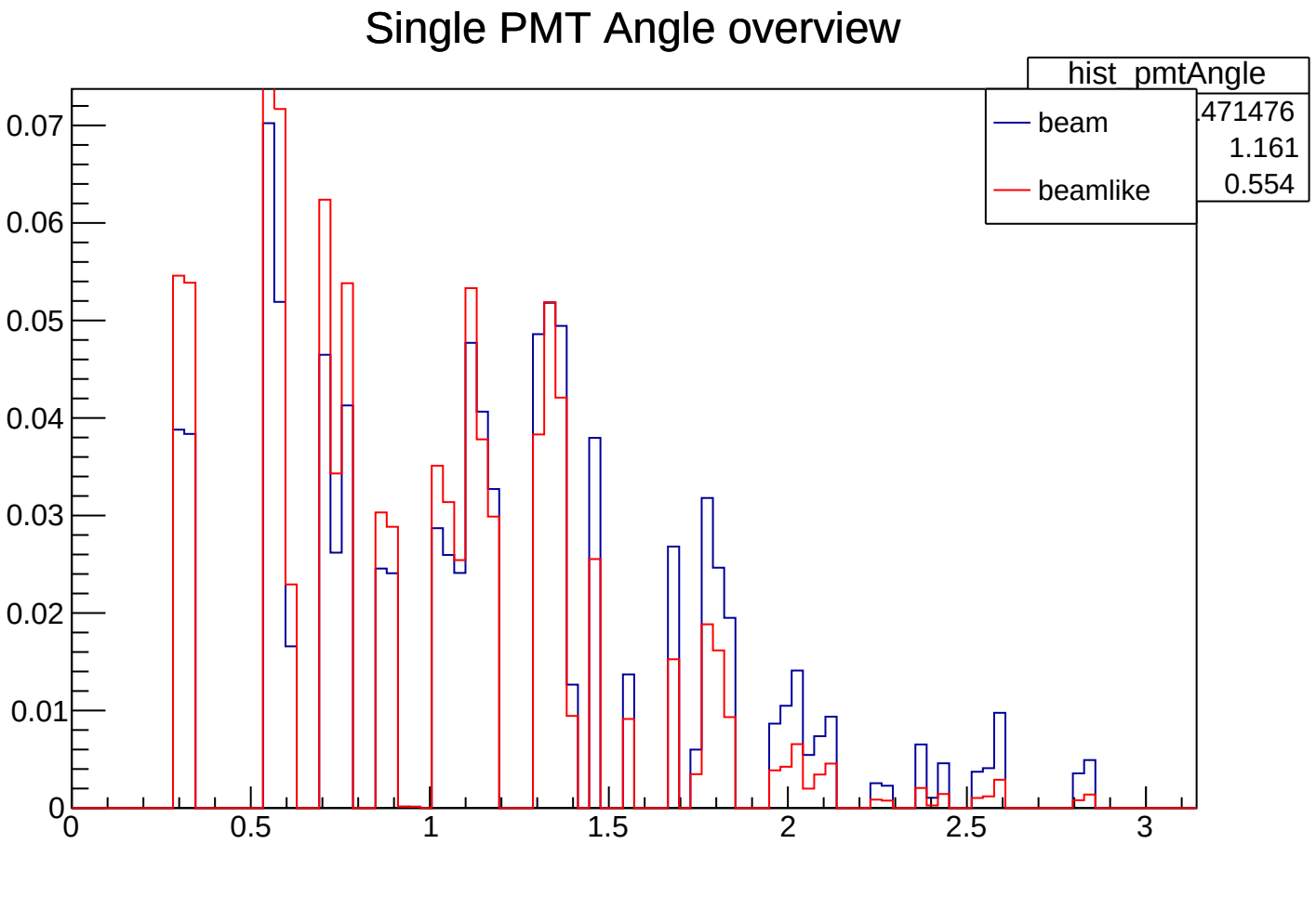
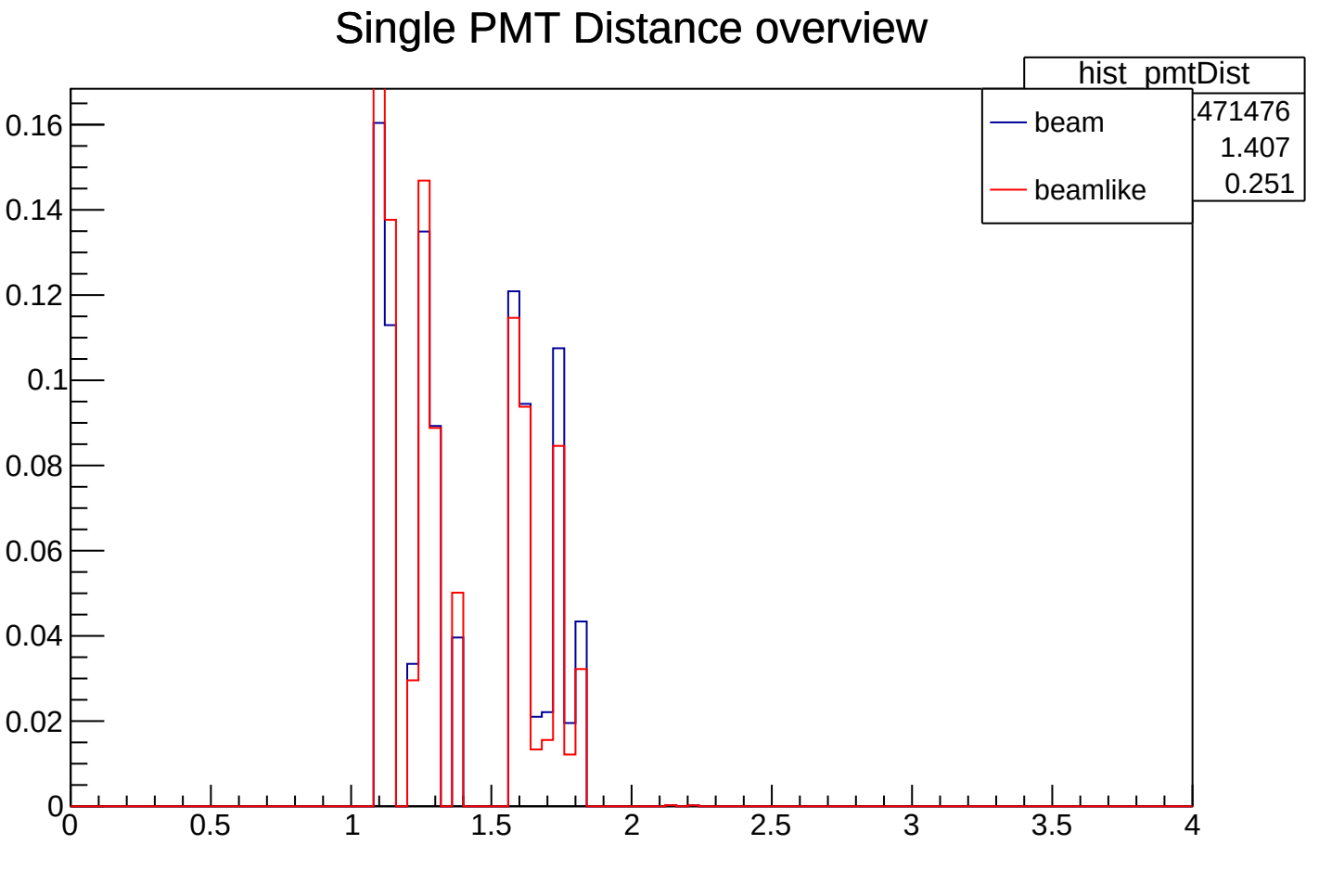
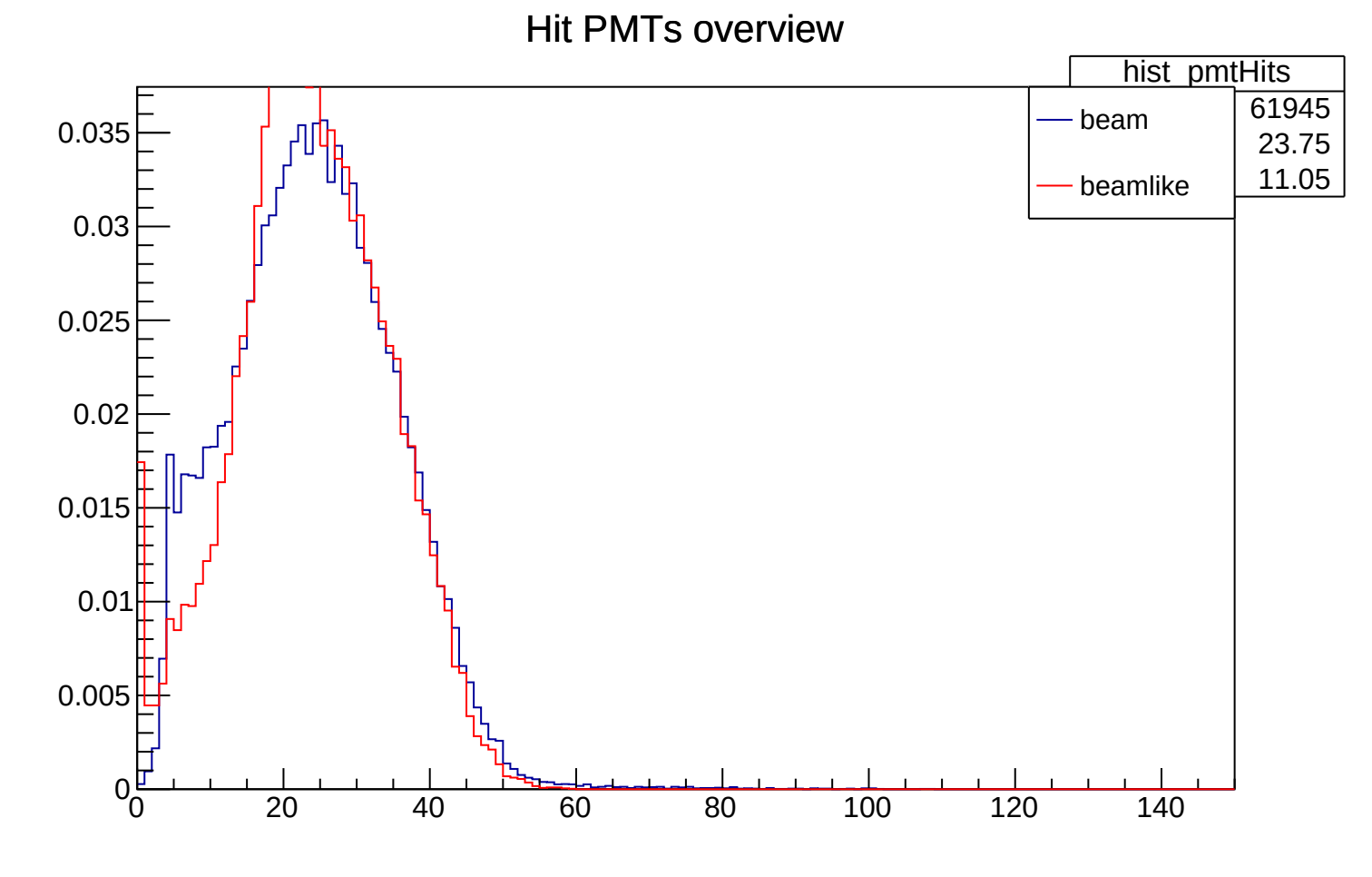
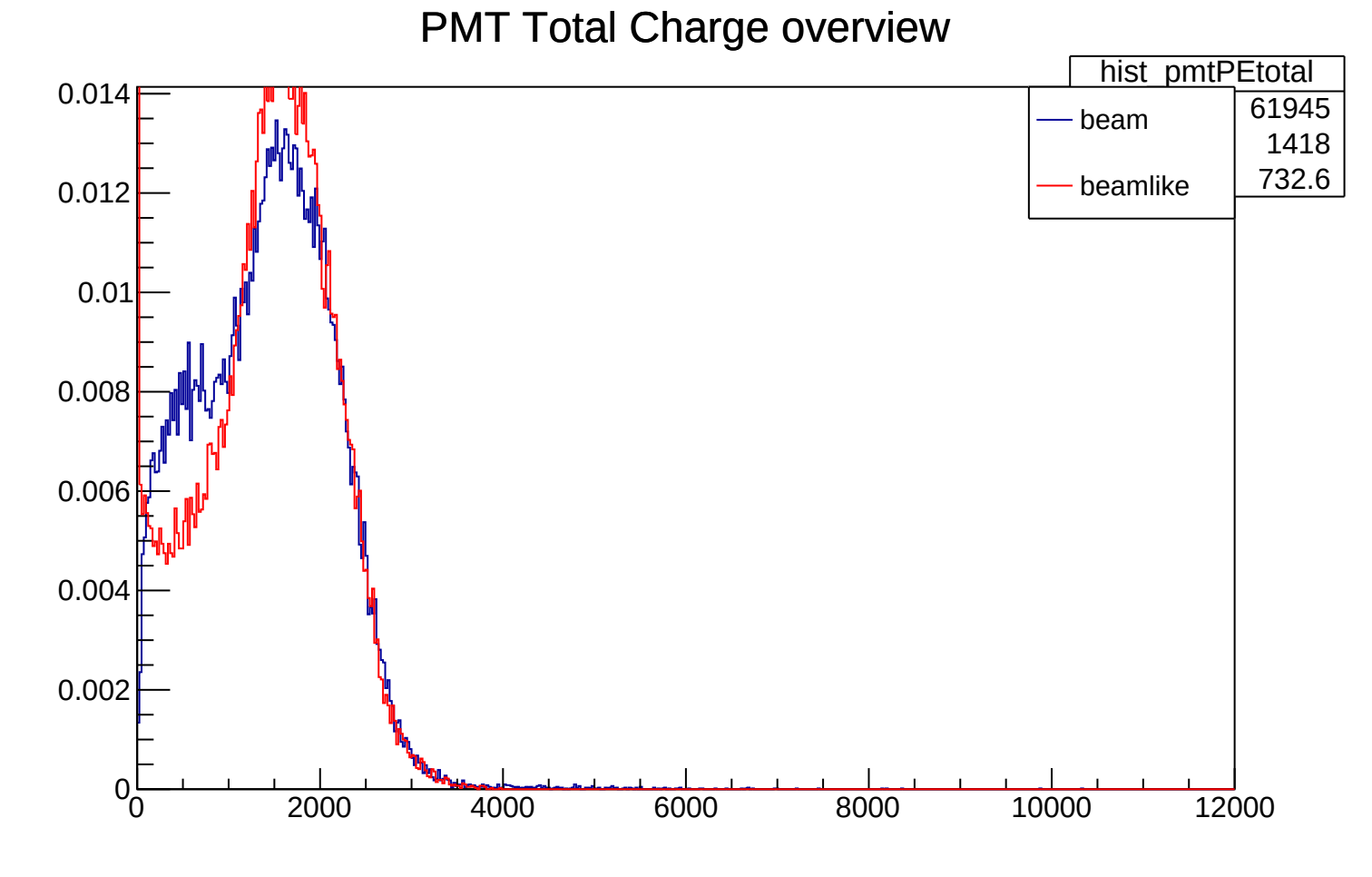

Single PMT Charge overview
hist pmtPE
beam
beamlike
.471476
58.67
57.17
0.03
0.025
0.02
0.015
0.01
0.005
0
0
50
100
150
200
250
300
350
400
450
500

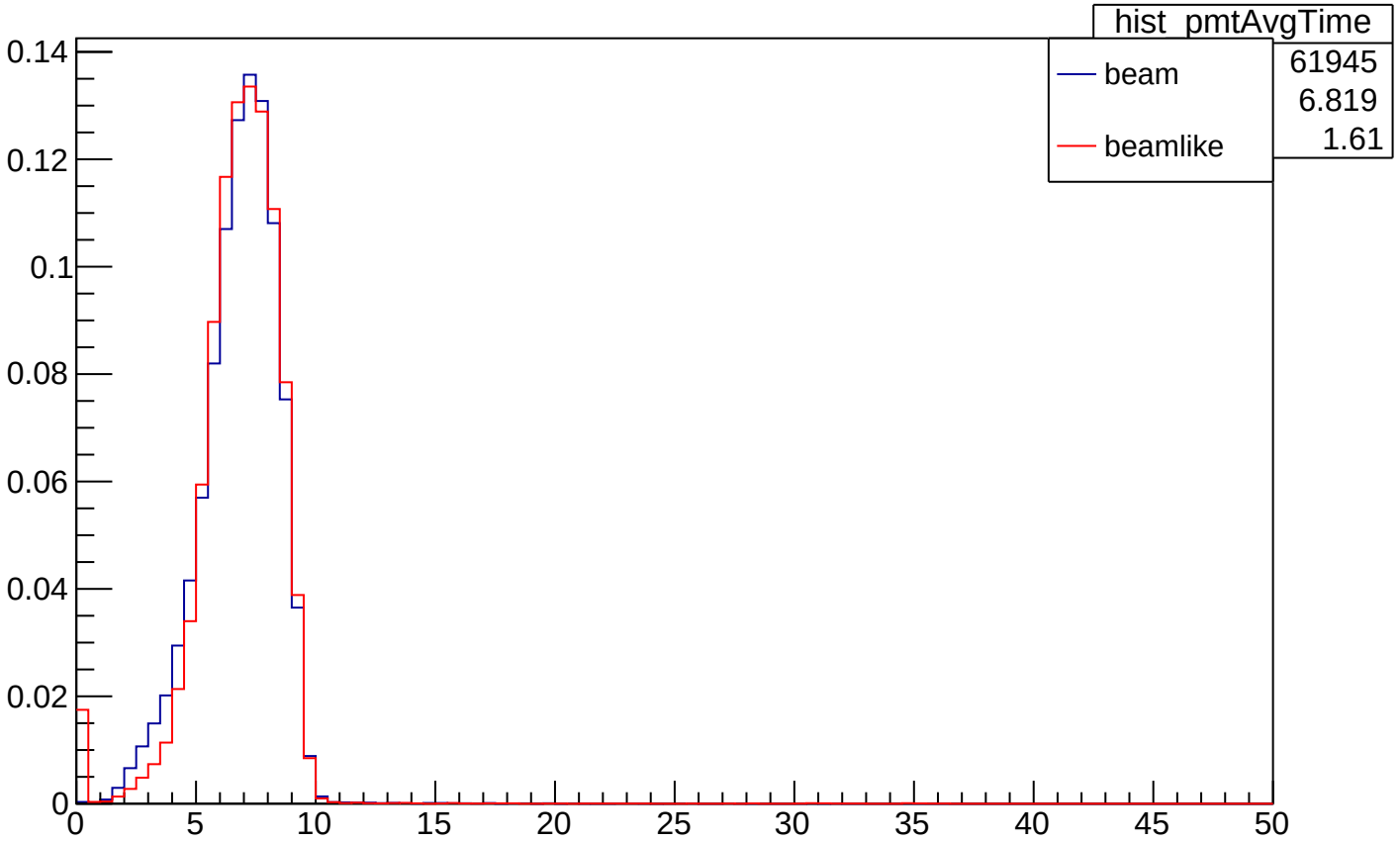

Single PMT Time overview
hist_pmtTime
beam
beamlike
.471476
7.413
2.584
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000

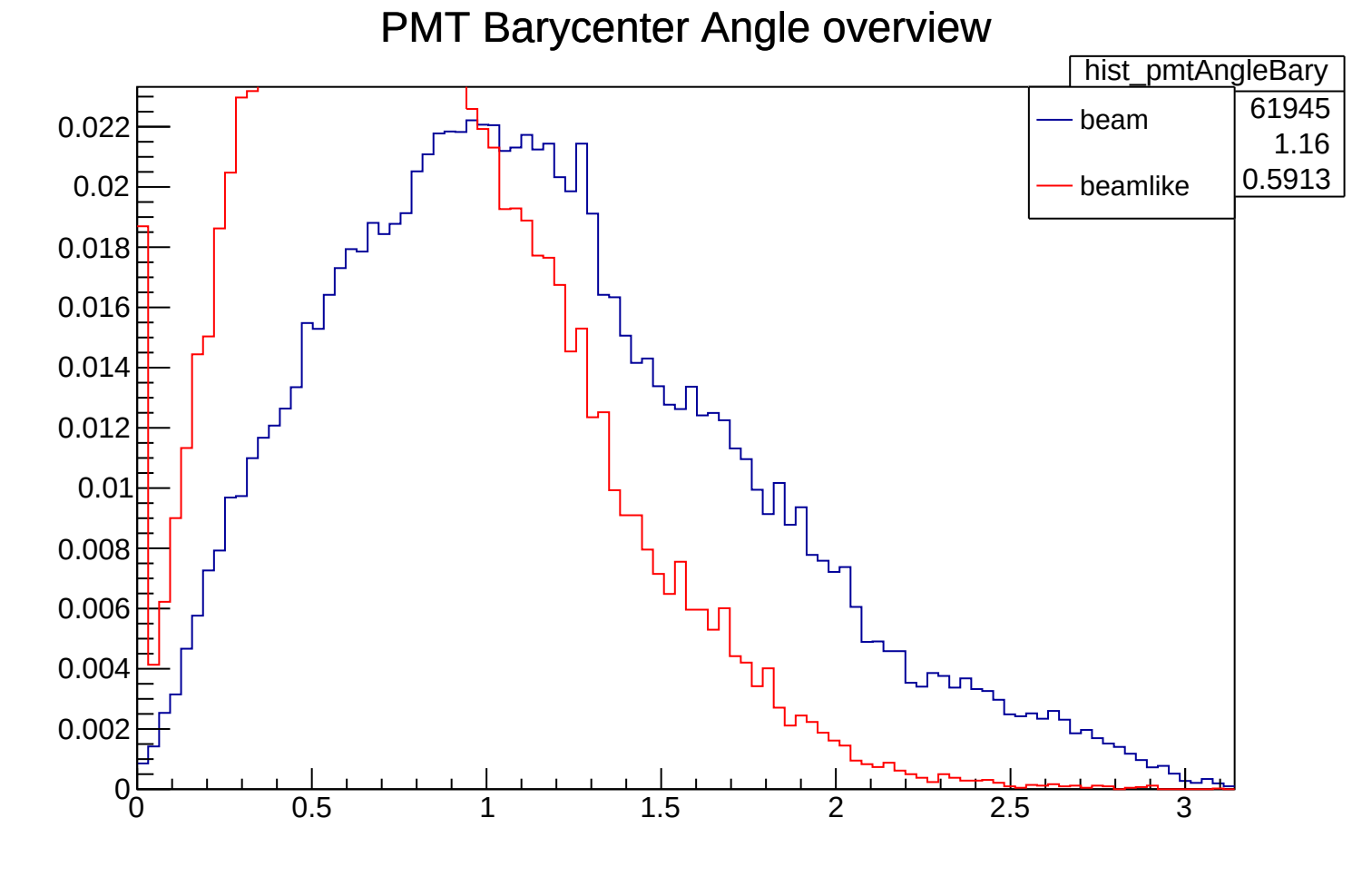

Single PMT Angle overview
hist pmtAngle
beam
beamlike
471476
1.161
0.554
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1
1.5
2
2.5
3

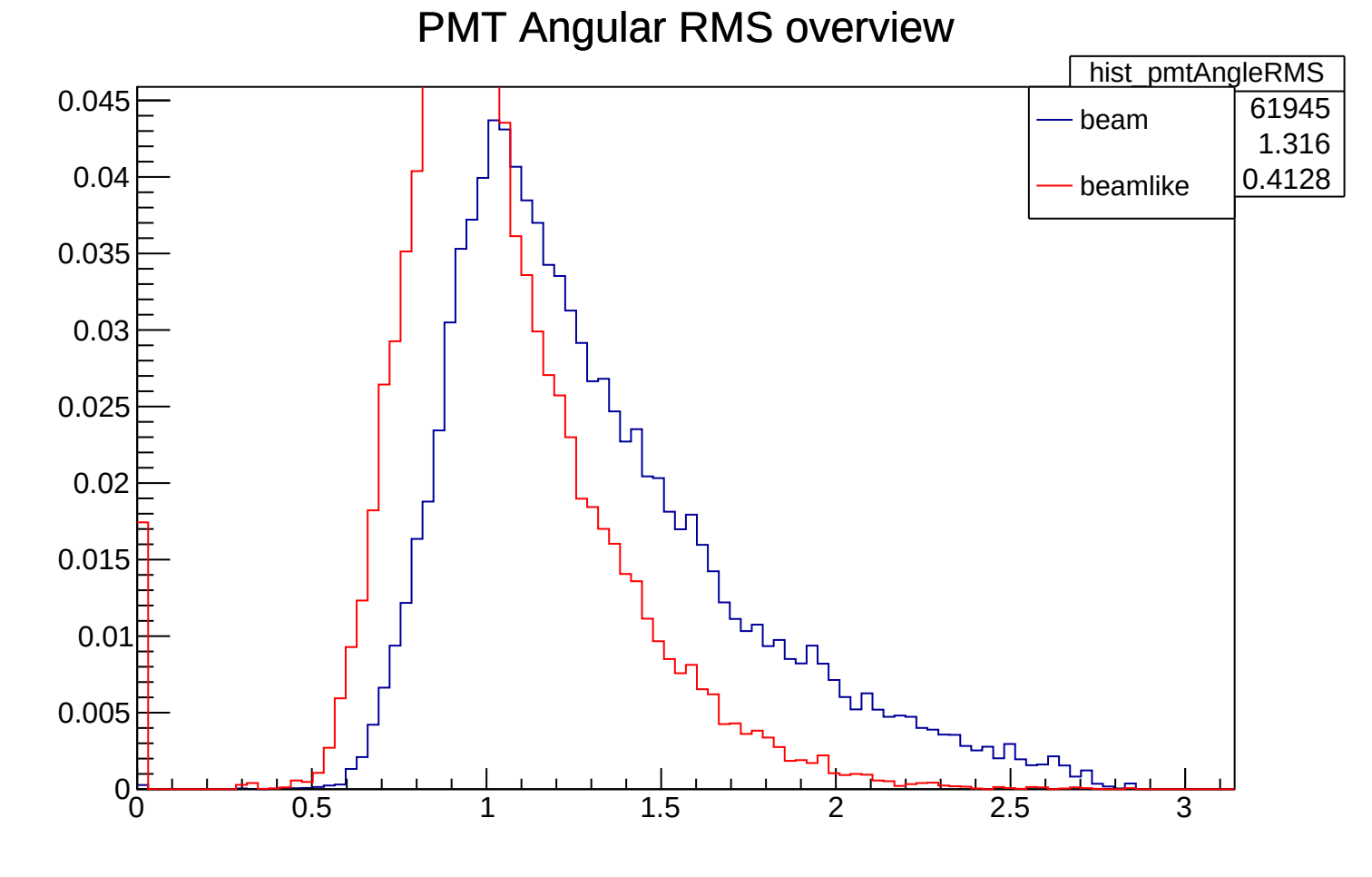

Single PMT Distance overview
hist pmtDist
beam
beamlike
.471476
1.407
0.251
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.5
1
1.5
2
2.5
3
3.5
4

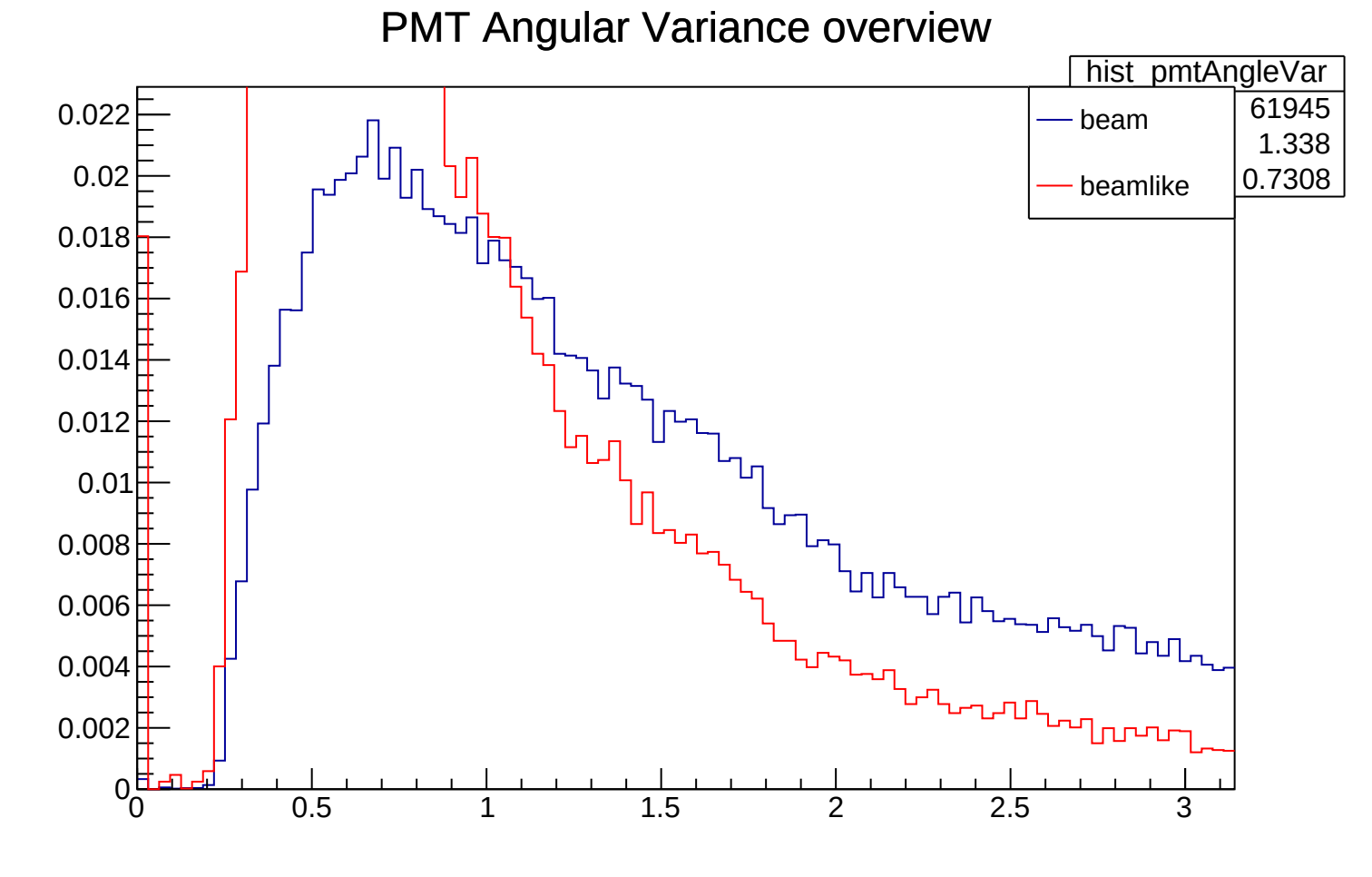

Hit PMTs overview
hist pmtHits
61945
23.75
11.05
beam
beamlike
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
20
40
60
80
100
120
140

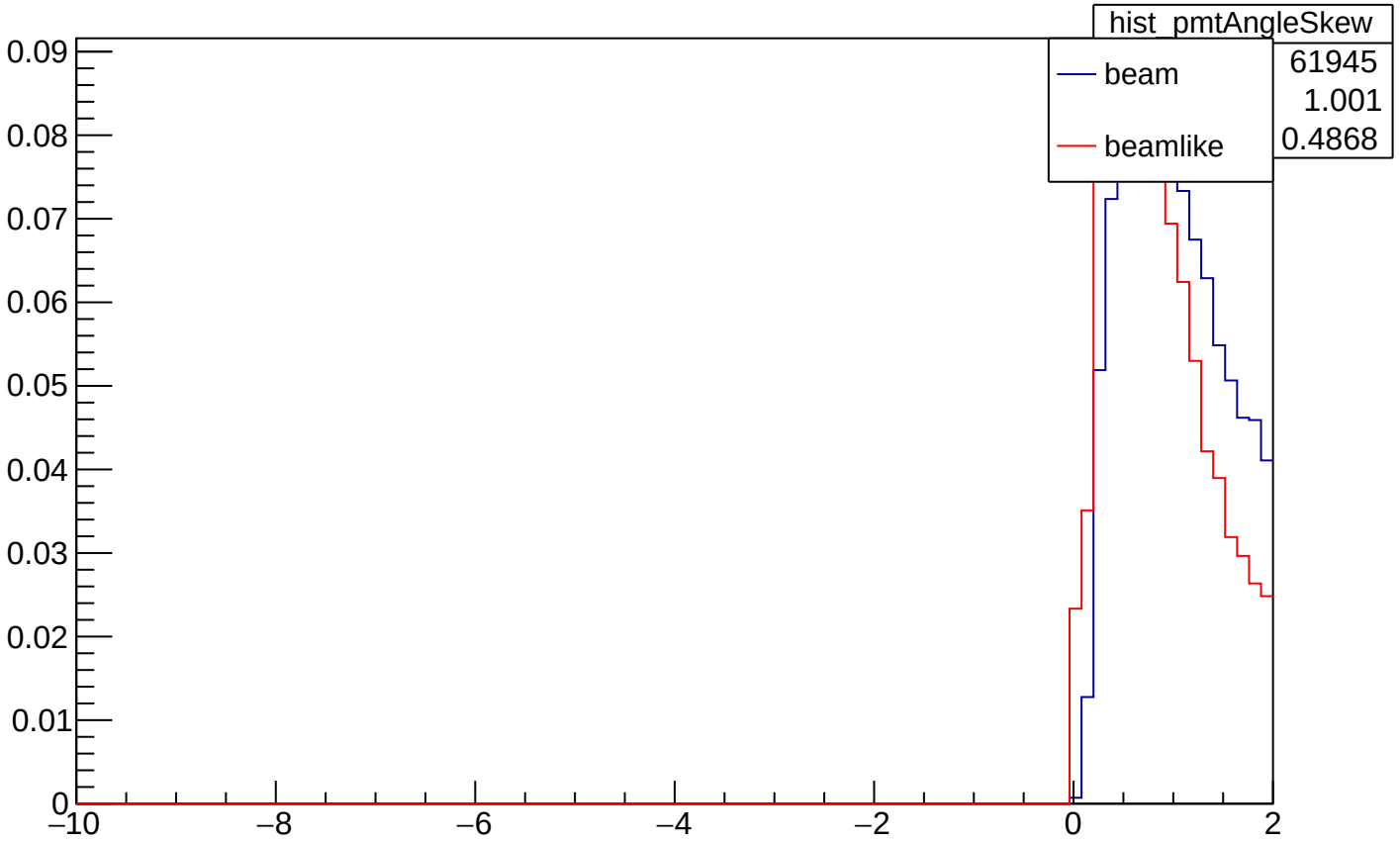

PMT Total Charge overview
hist pmtPEtotal
61945
1418
732.6
beam
beamlike
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
0
2000
4000
6000
8000
10000
12000

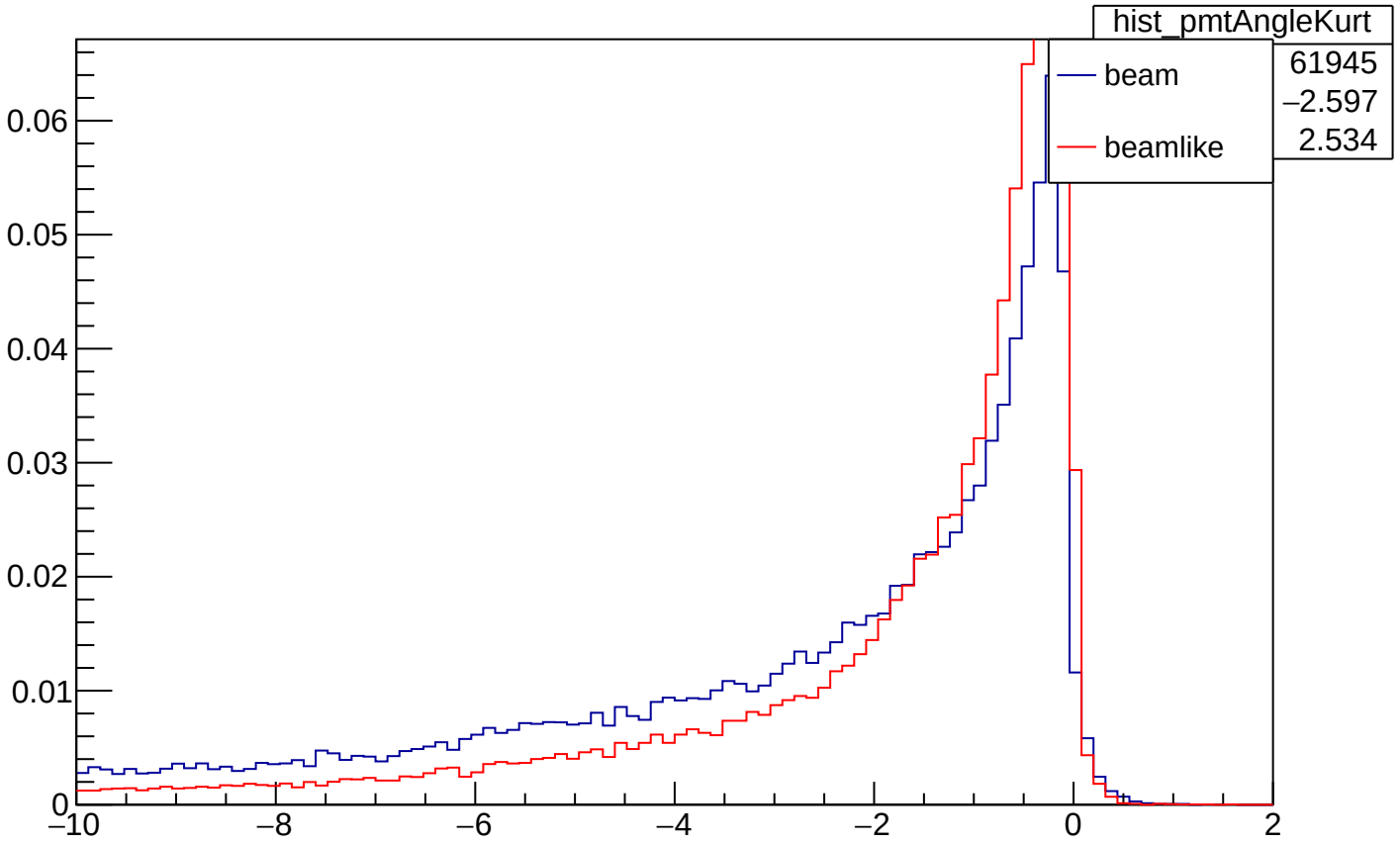

PMT Average Time overview
hist pmtAvgTime
61945
6.819
1.61
beam
beamlike
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
5
10
15
20
25
30
35
40
45
50

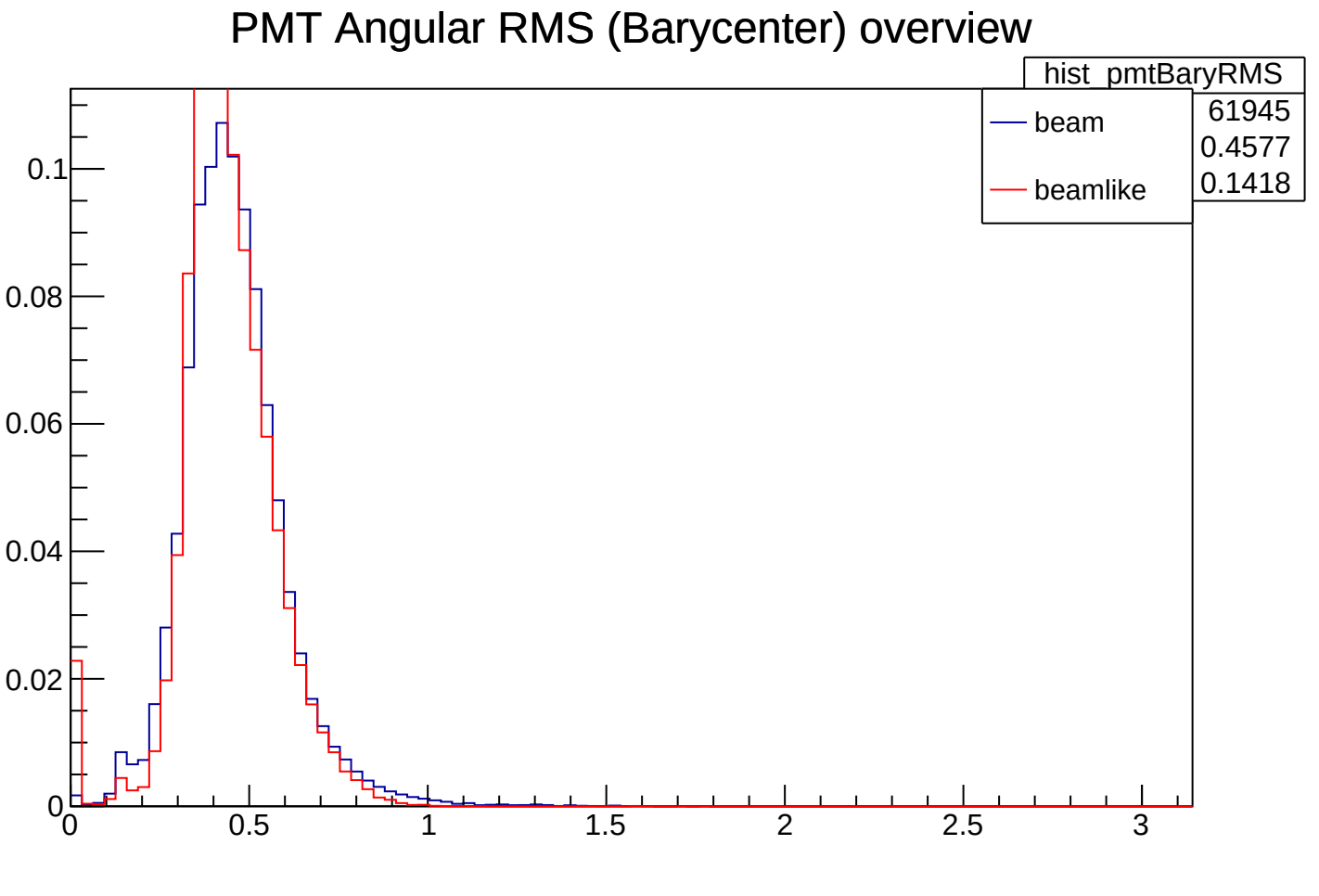

PMT Barycenter Angle overview
hist_pmtAngleBary
61945
1.16
0.5913
beam
beamlike
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
0
0.5
1
1.5
2
2.5
3

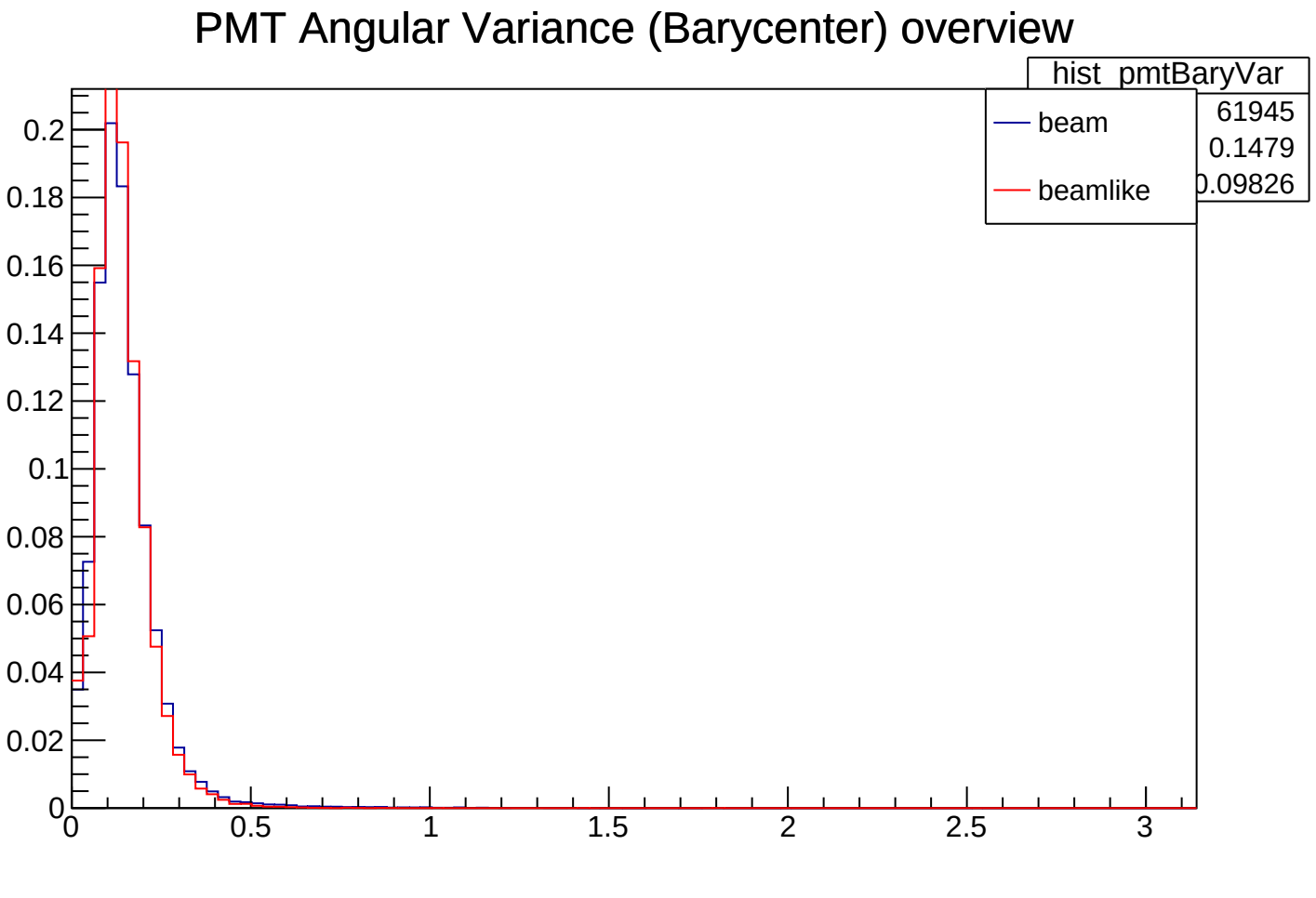

PMT Angular RMS overview
hist_pmtAngleRMS
61945
1.316
0.4128
beam
beamlike
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.5
1
1.5
2
2.5
3

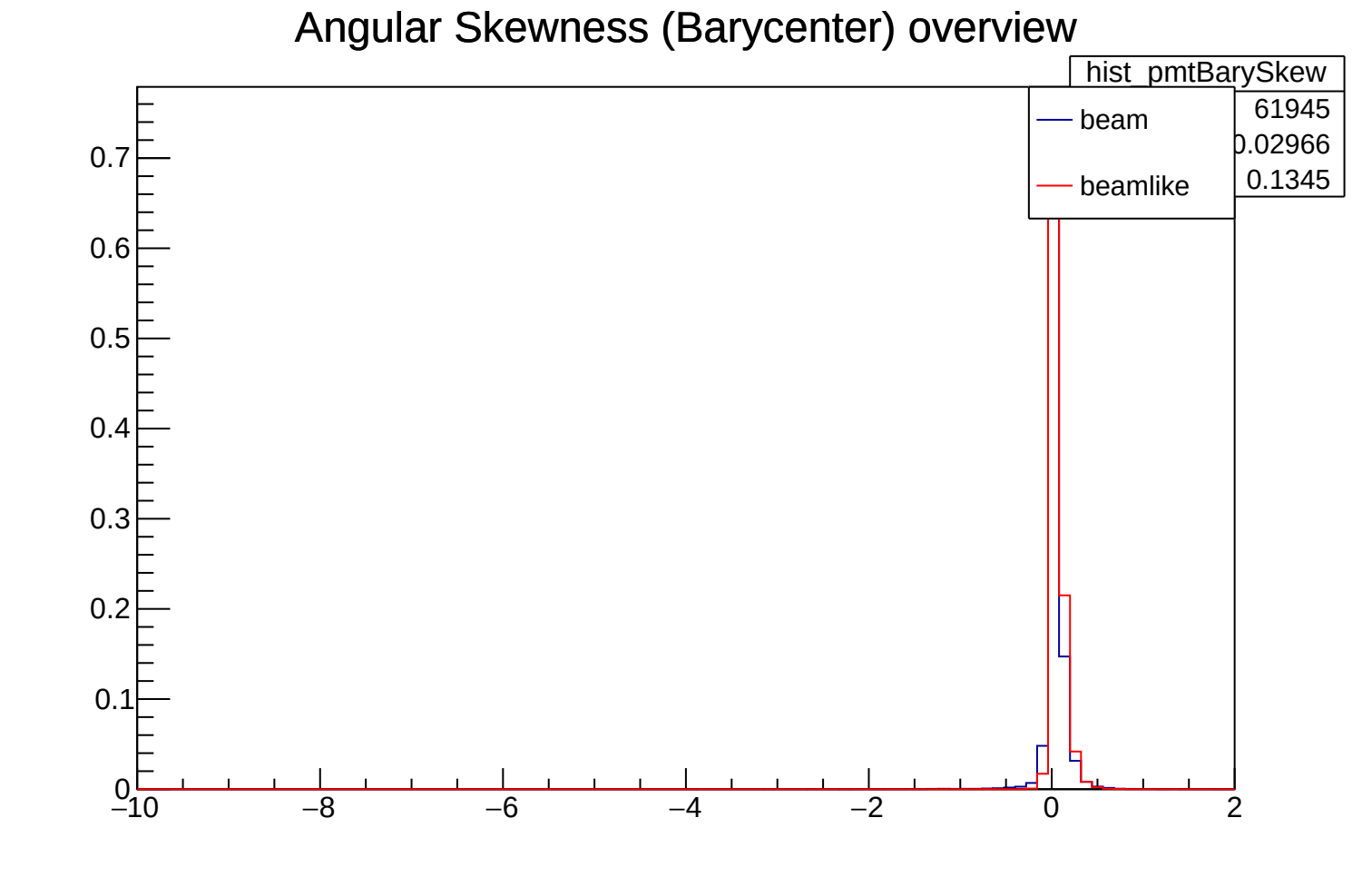

PMT Angular Variance overview
hist pmtAngleVar
61945
1.338
0.7308
beam
beamlike
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
0
0.5
1
1.5
2
2.5
3

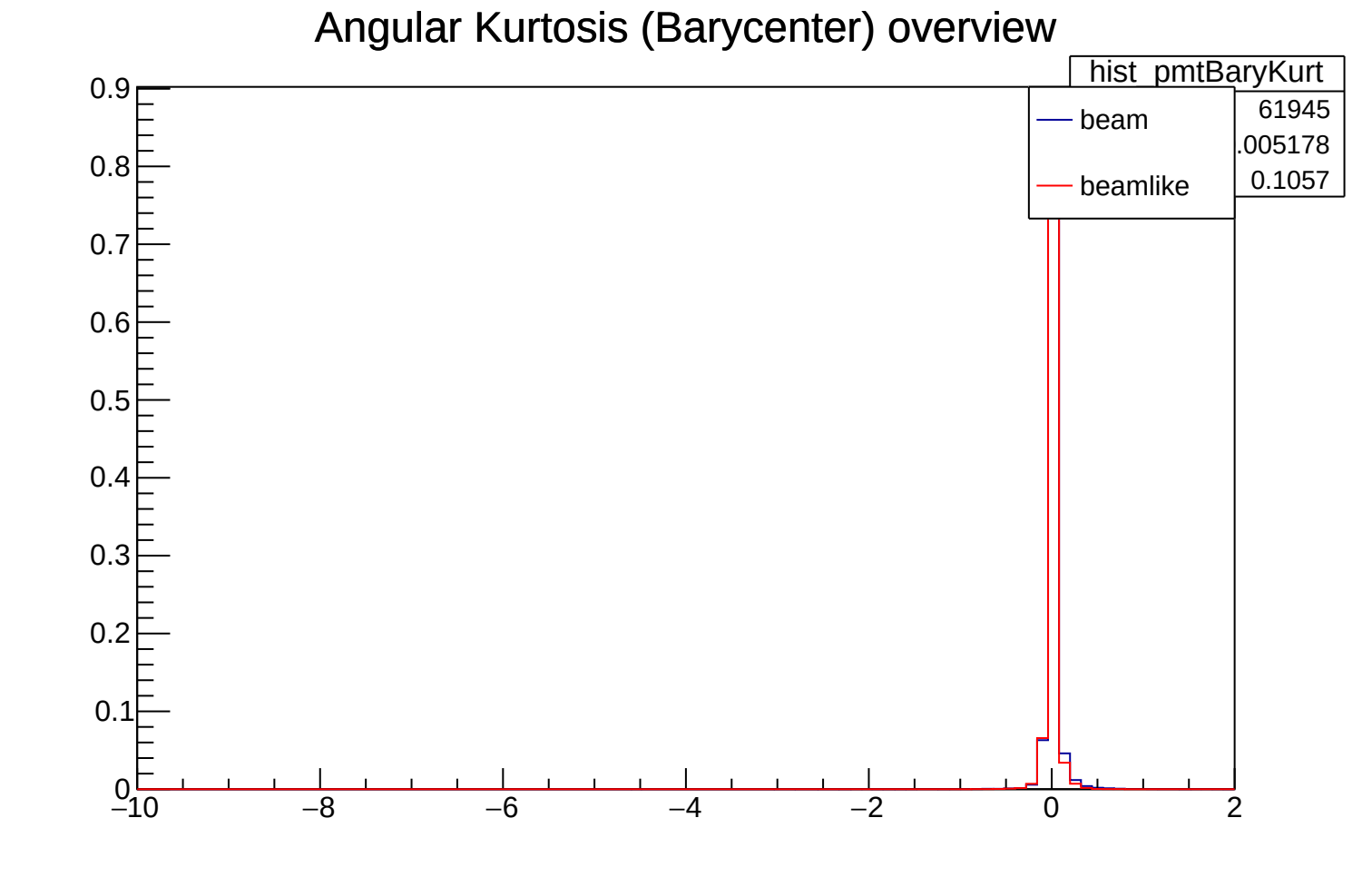

PMT Angular Skewness overview
hist_pmtAngleSkew
61945
1.001
0.4868
beam
beamlike
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
−10
−8
−6
−4
−2
0
2

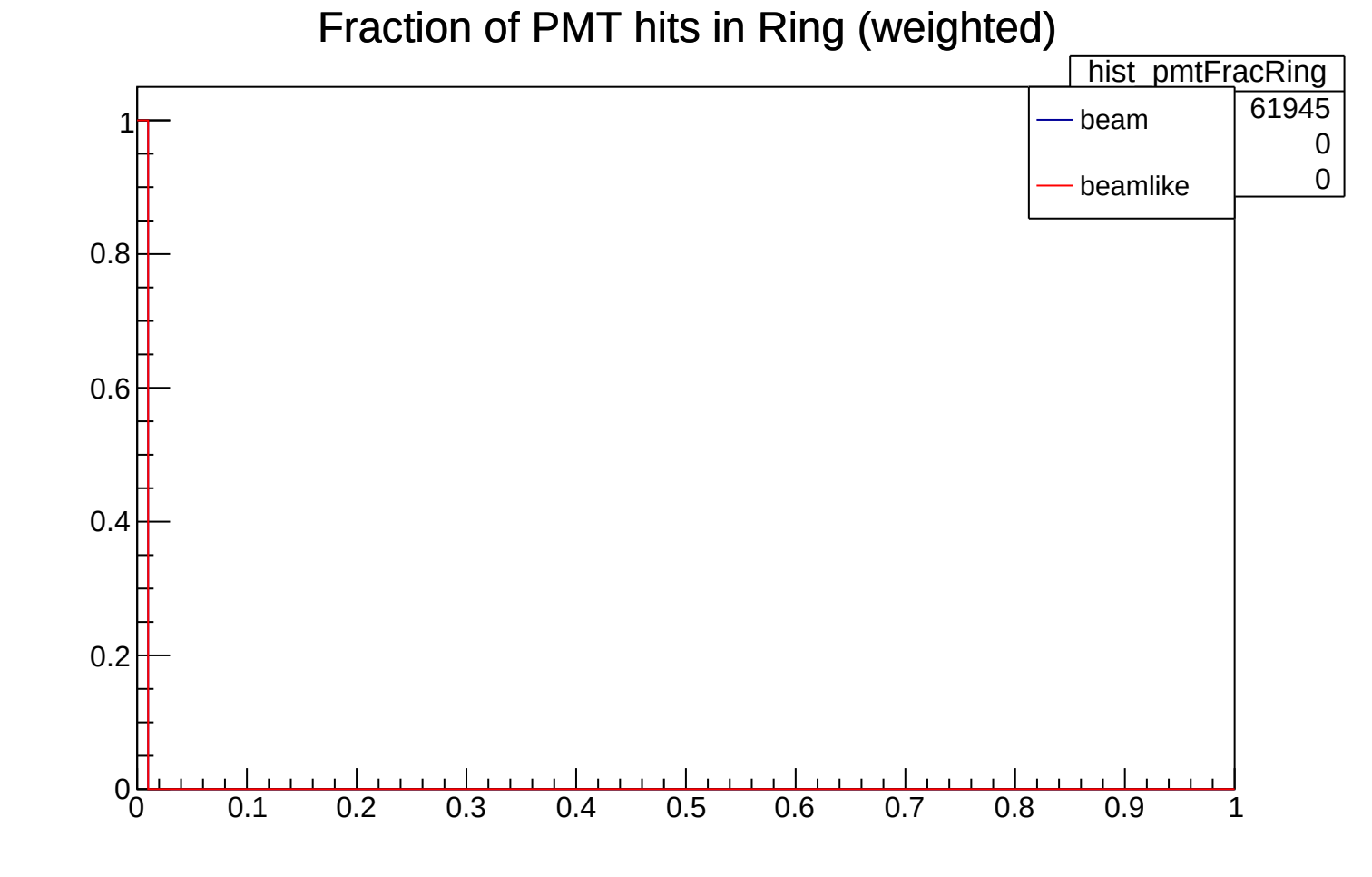

PMT Angular Kurtosis overview
hist_pmtAngleKurt
61945
−2.597
2.534
beam
beamlike
0.06
0.05
0.04
0.03
0.02
0.01
0
−10
−8
−6
−4
−2
0
2

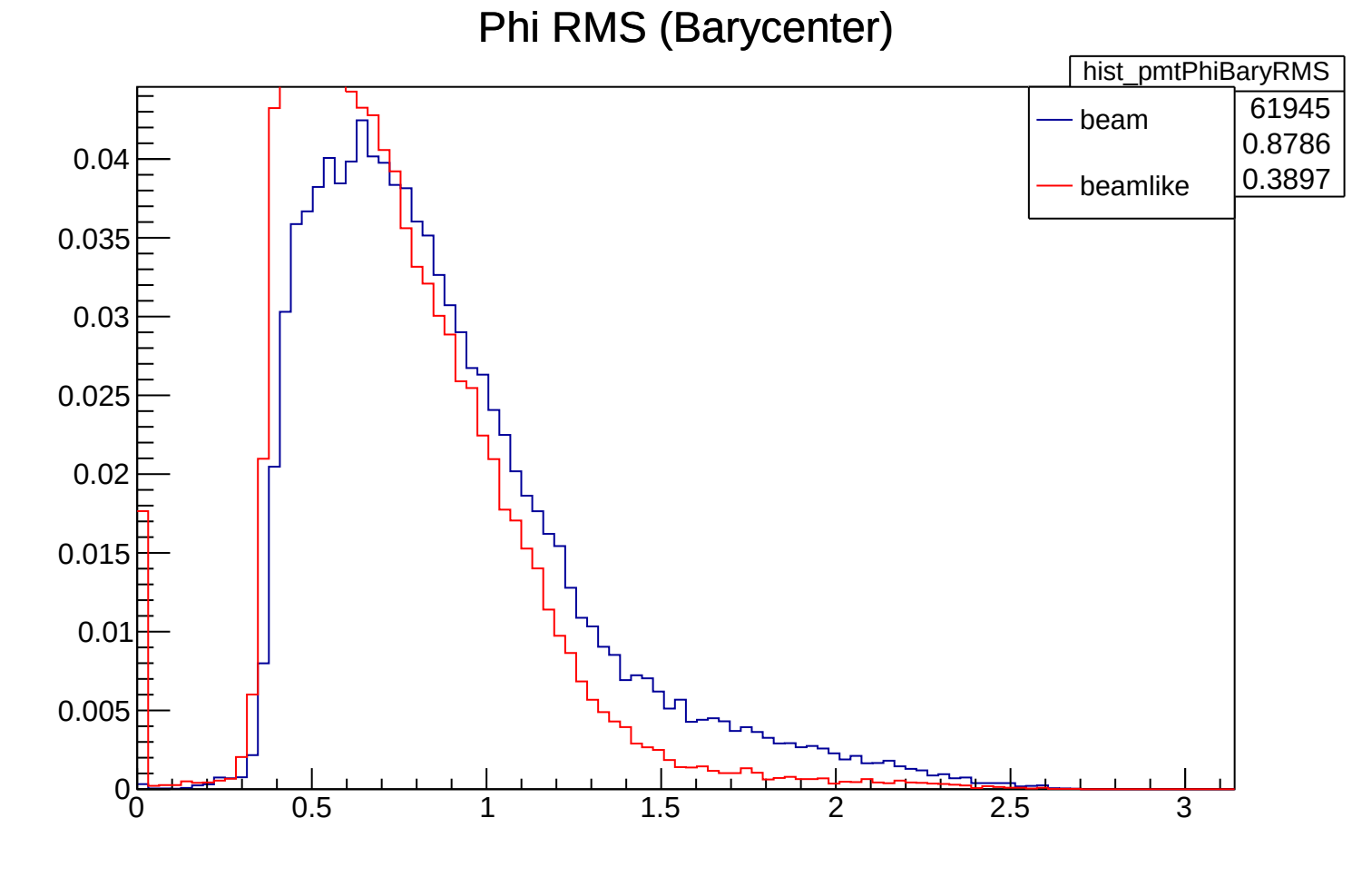

PMT Angular RMS (Barycenter) overview
hist_pmtBaryRMS
61945
0.4577
0.1418
beam
beamlike
0.1
0.08
0.06
0.04
0.02
0
0
0.5
1
1.5
2
2.5
3

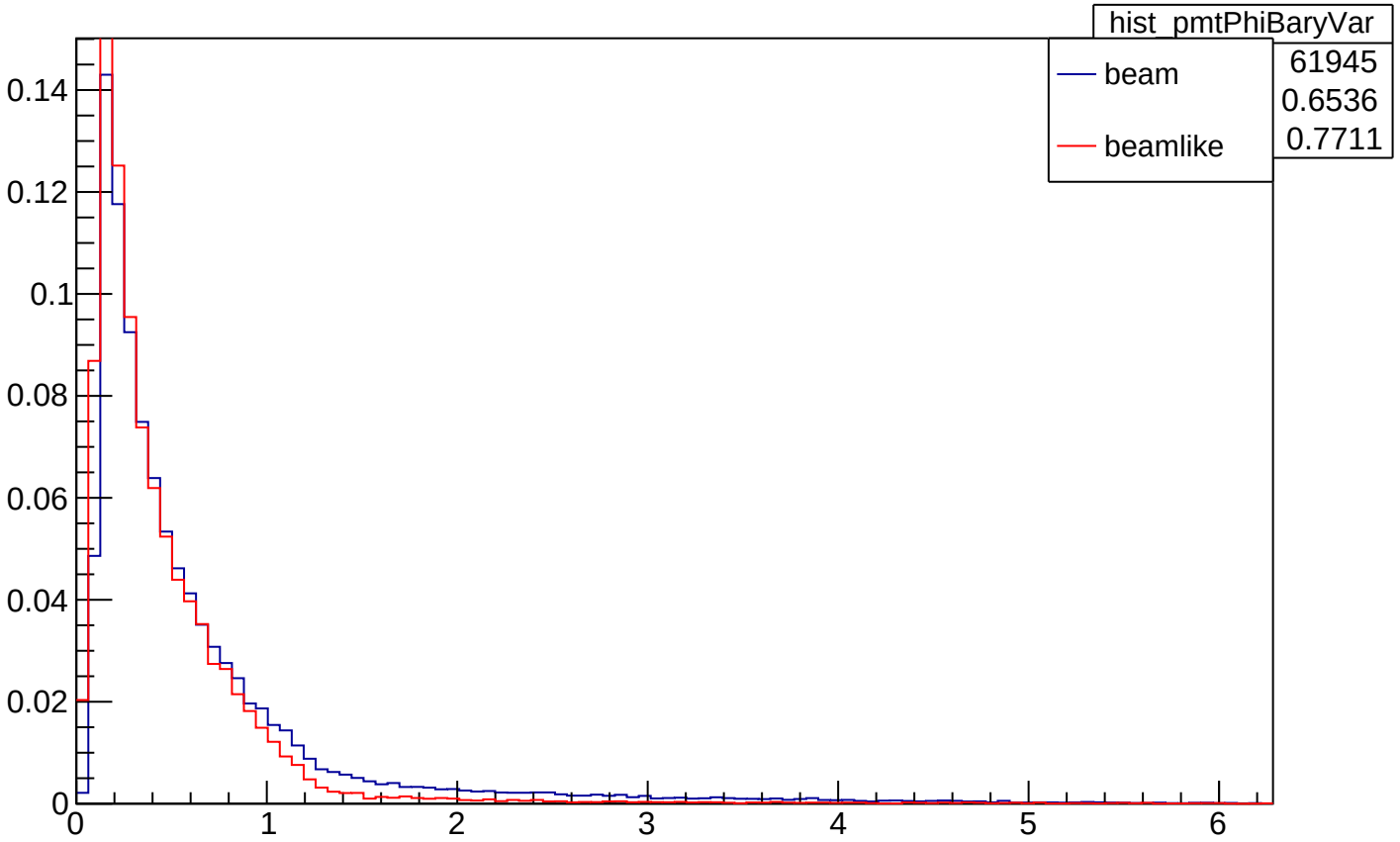

PMT Angular Variance (Barycenter) overview
hist pmtBaryVar
61945
0.1479
0.09826
beam
beamlike
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.5
1
1.5
2
2.5
3

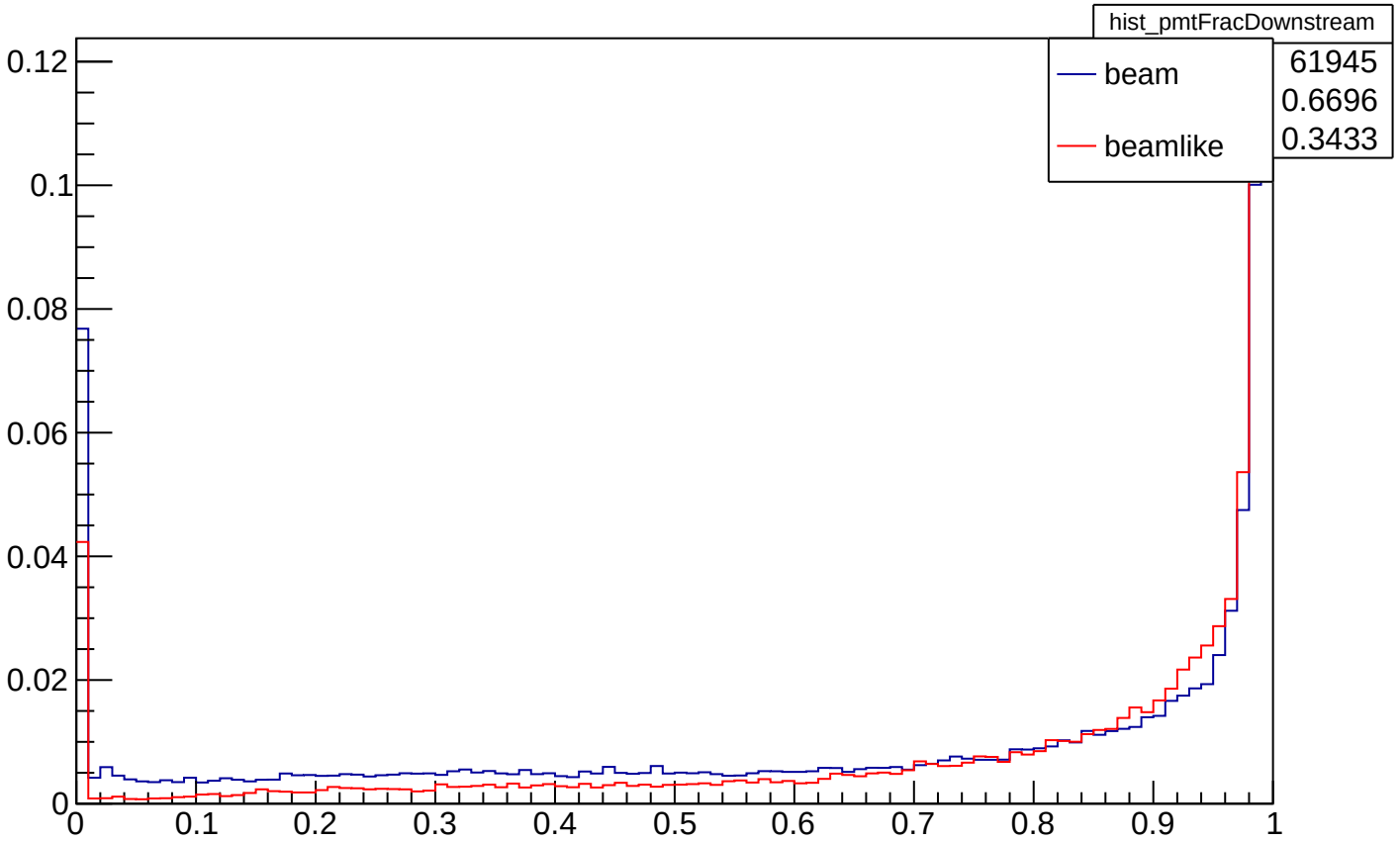

Angular Skewness (Barycenter) overview
hist_pmtBarySkew
61945
0.02966
0.1345
beam
beamlike
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
−10
−8
−6
−4
−2
0
2

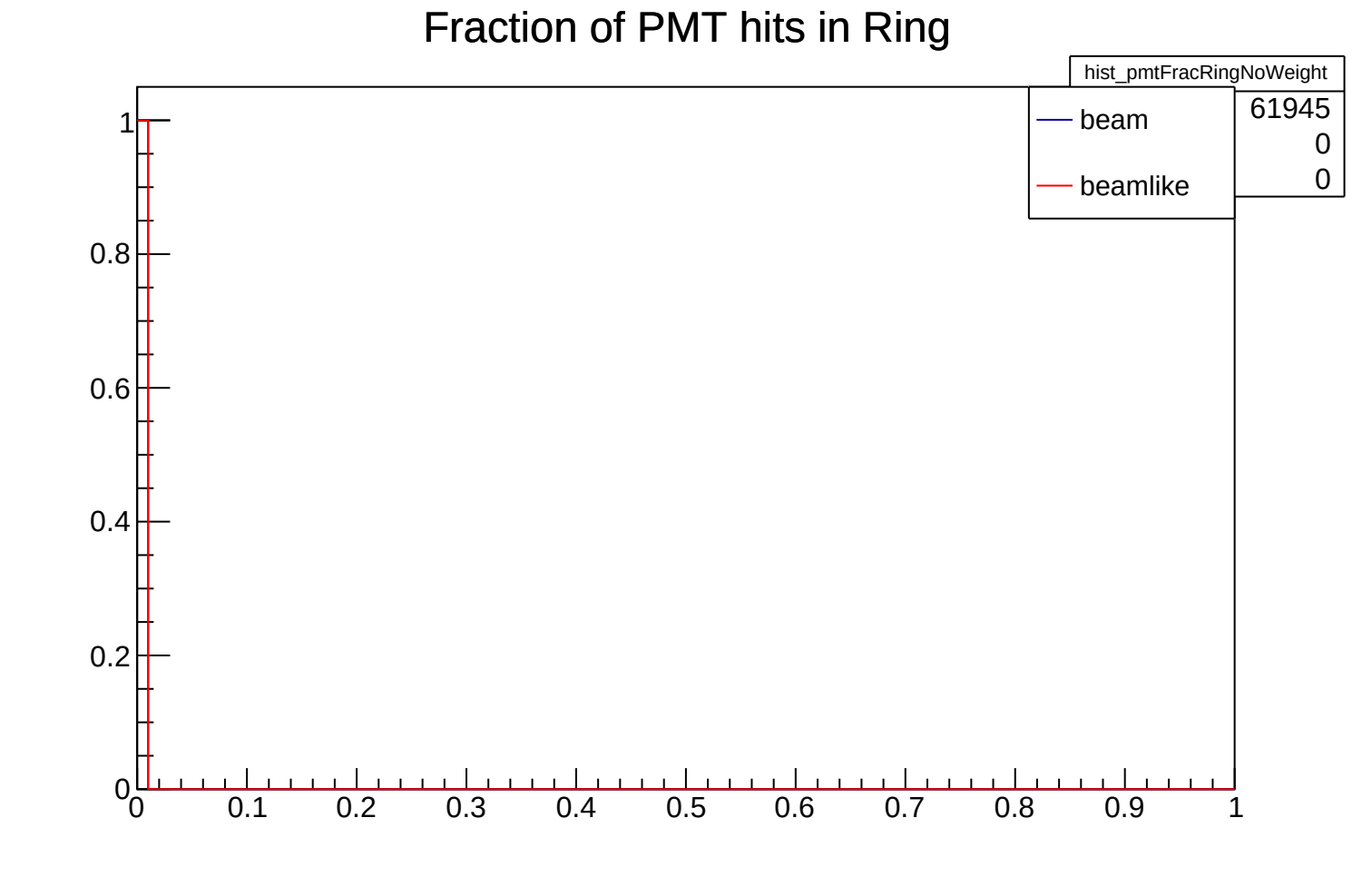

Angular Kurtosis (Barycenter) overview
hist_pmtBaryKurt
beam
beamlike
61945
.005178
0.1057
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
−10
−8
−6
−4
−2
0
2

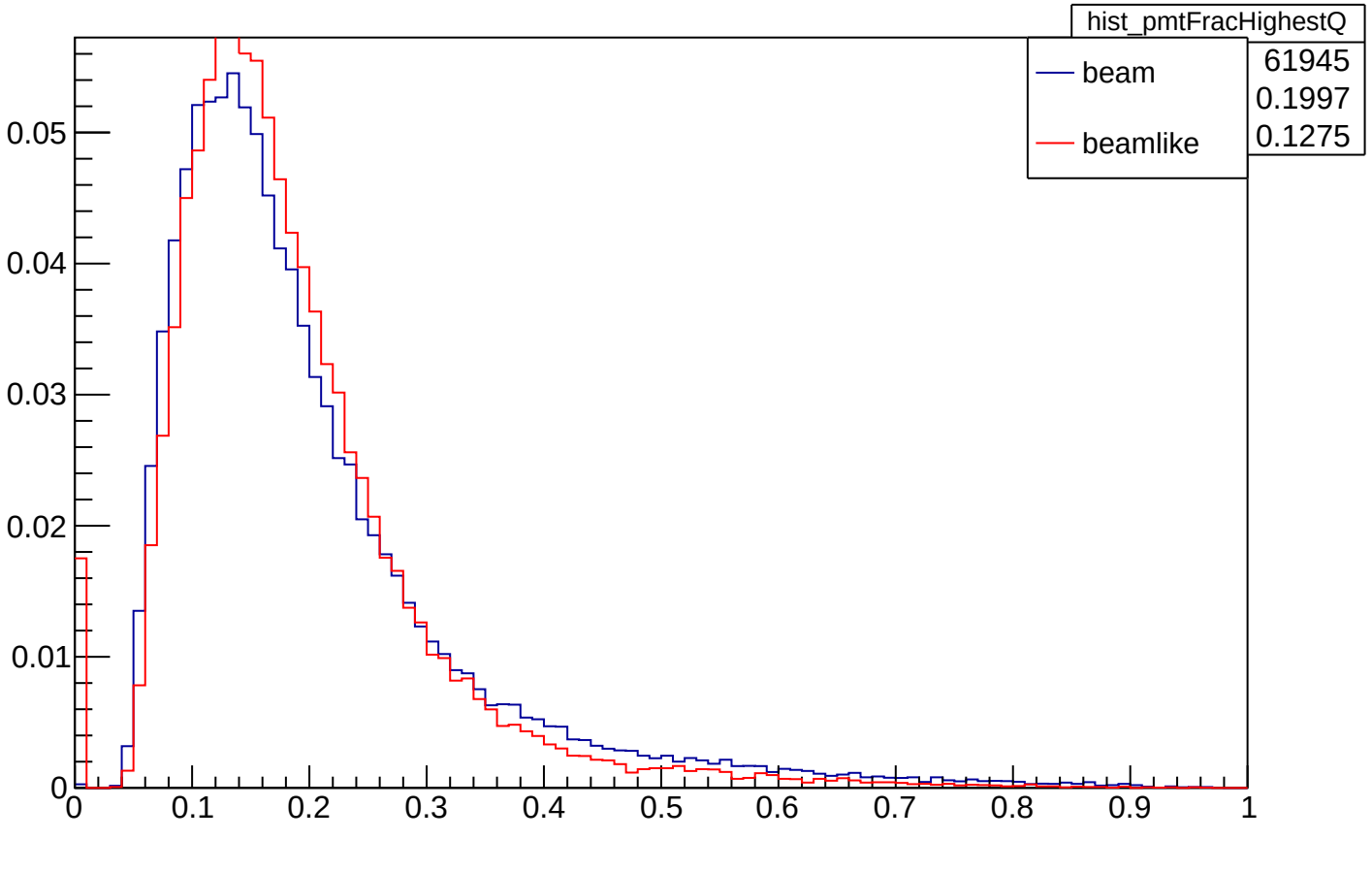

Fraction of PMT hits in Ring (weighted)
hist_pmtFracRing
61945
0
0
beam
beamlike
1
0.8
0.6
0.4
0.2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

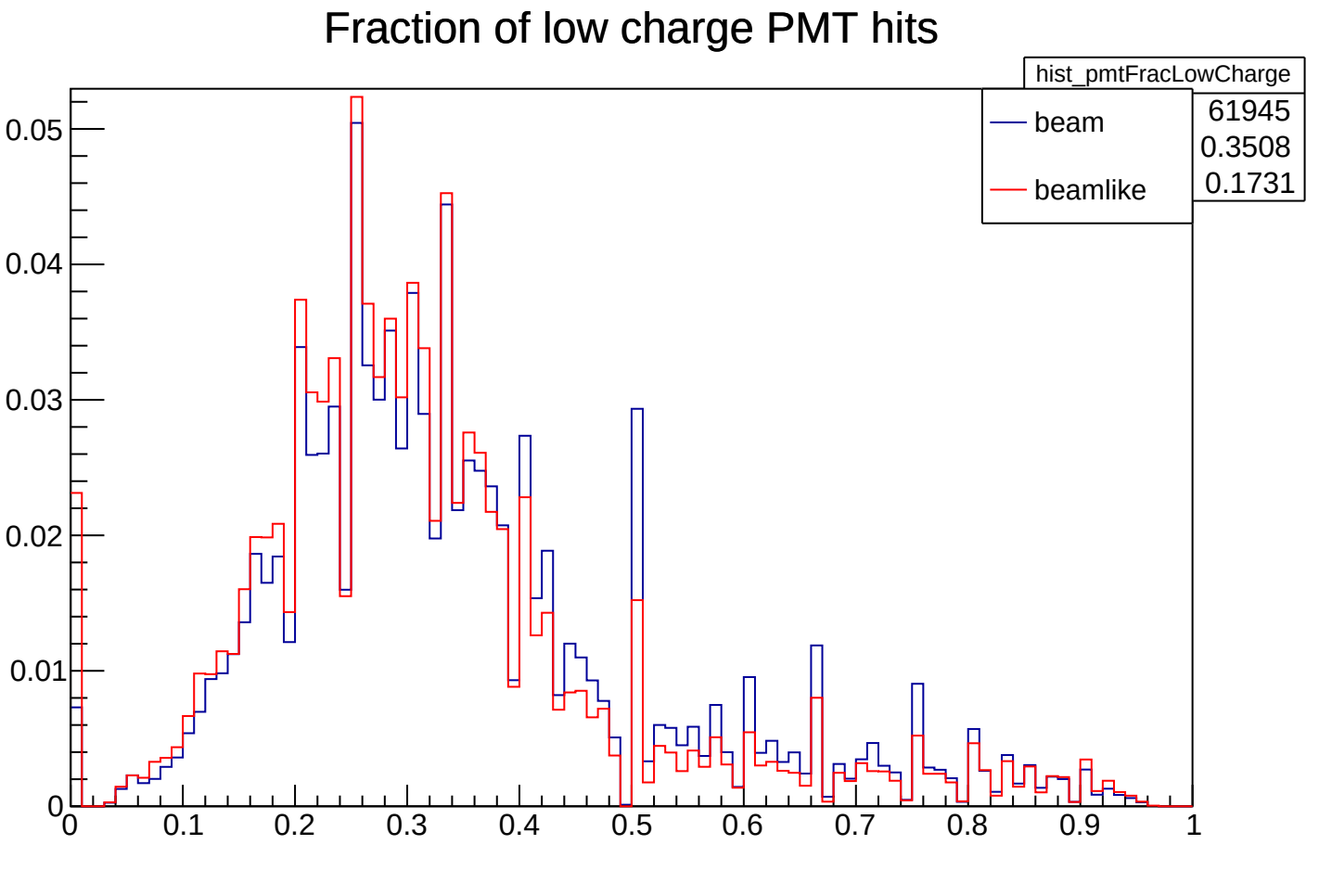

Phi RMS (Barycenter)
hist_pmtPhiBaryRMS
61945
0.8786
0.3897
beam
beamlike
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.5
1
1.5
2
2.5
3

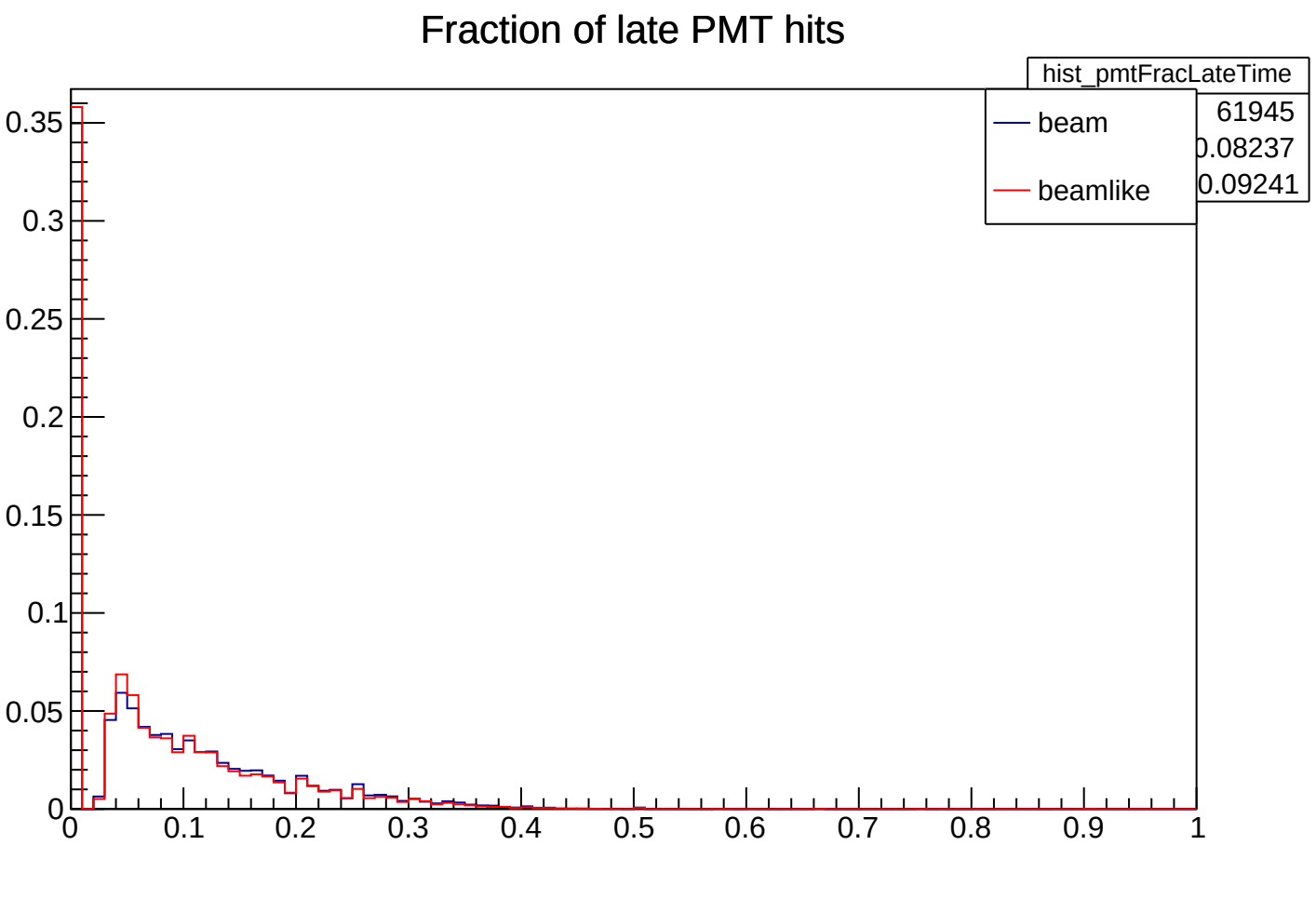

Phi Variance (Barycenter)
hist_pmtPhiBaryVar
61945
0.6536
0.7711
beam
beamlike
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
1
2
3
4
5
6

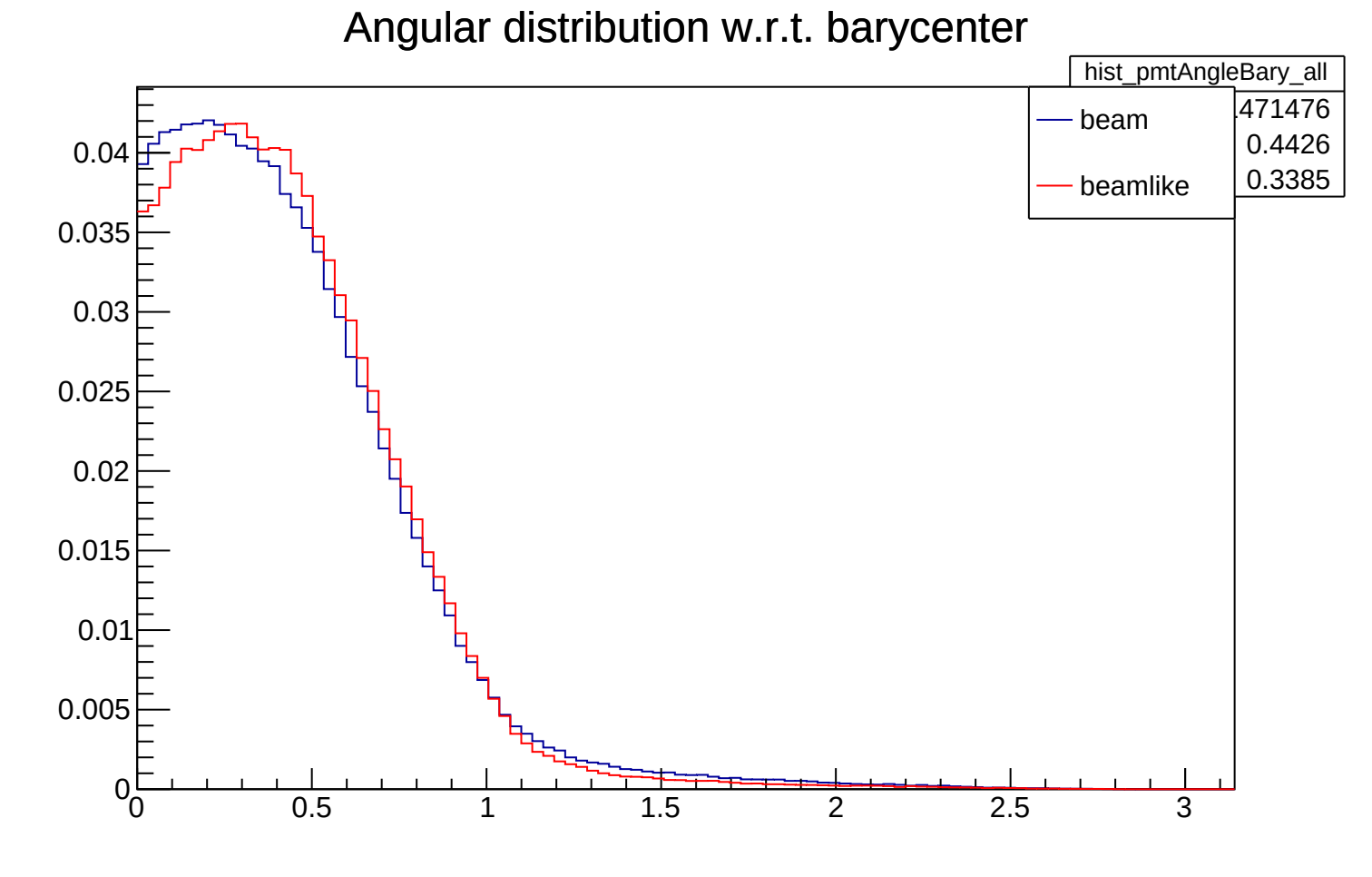

Fraction of PMT hits downstream
hist_pmtFracDownstream
beam
beamlike
61945
0.6696
0.3433
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

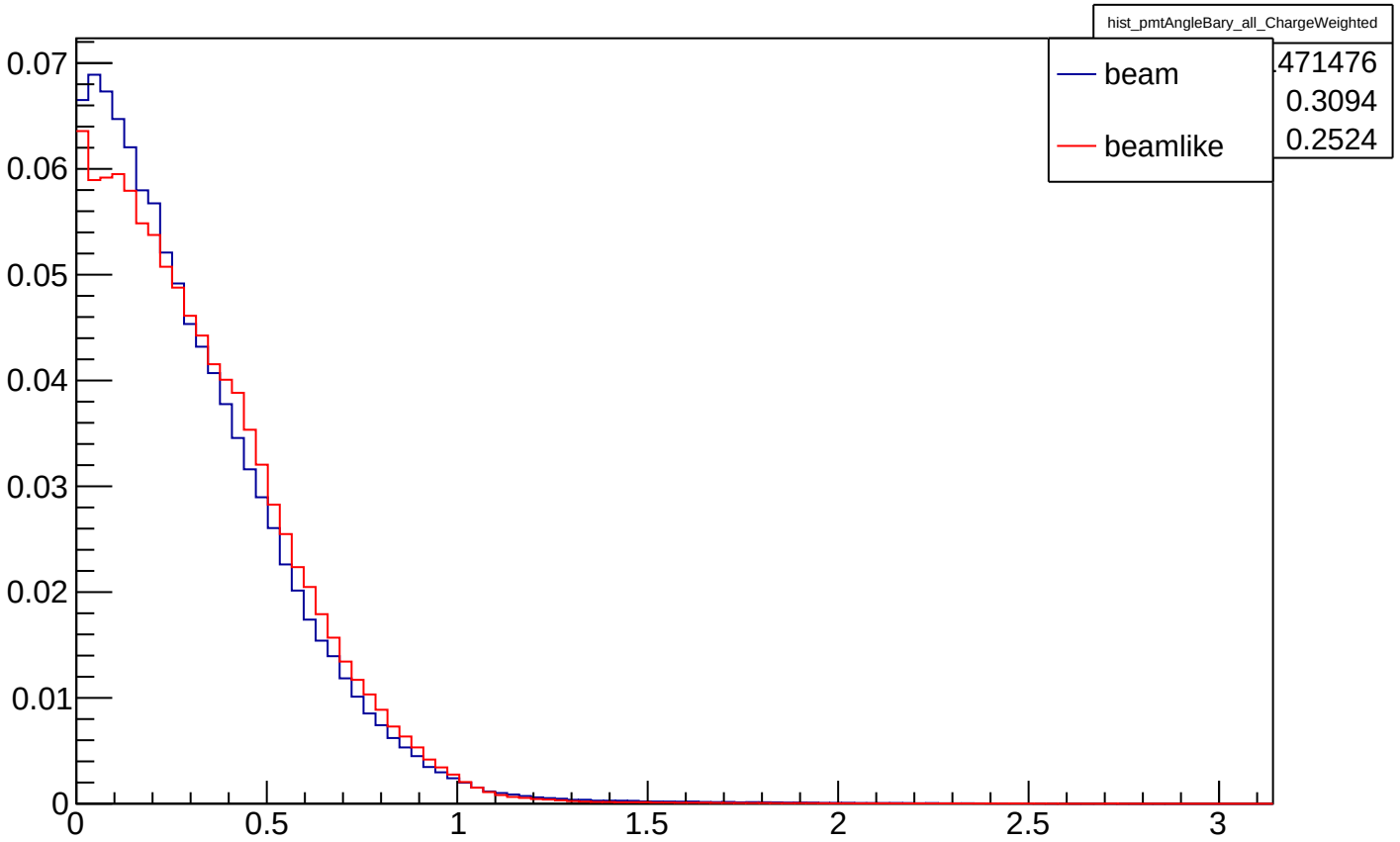

Fraction of PMT hits in Ring
hist_pmtFracRingNoWeight
61945
0
0
beam
beamlike
1
0.8
0.6
0.4
0.2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


Charge fraction highest PMT
hist_pmtFracHighestQ
61945
0.1997
0.1275
beam
beamlike
0.05
0.04
0.03
0.02
0.01
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

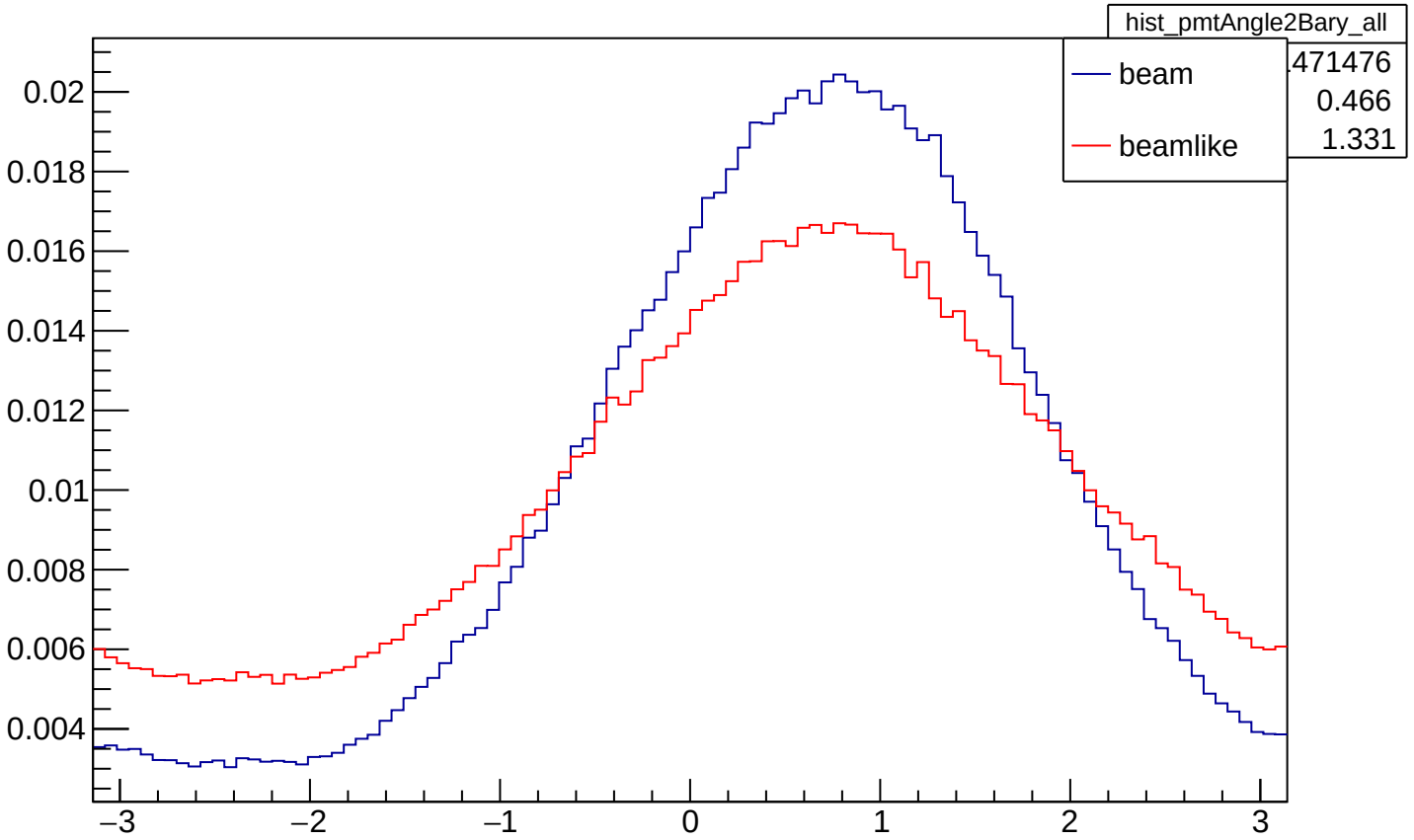

Fraction of low charge PMT hits
hist_pmtFracLowCharge
61945
0.3508
0.1731
beam
beamlike
0.05
0.04
0.03
0.02
0.01
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


Fraction of late PMT hits
hist_pmtFracLateTime
beam
beamlike
61945
0.08237
0.09241
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

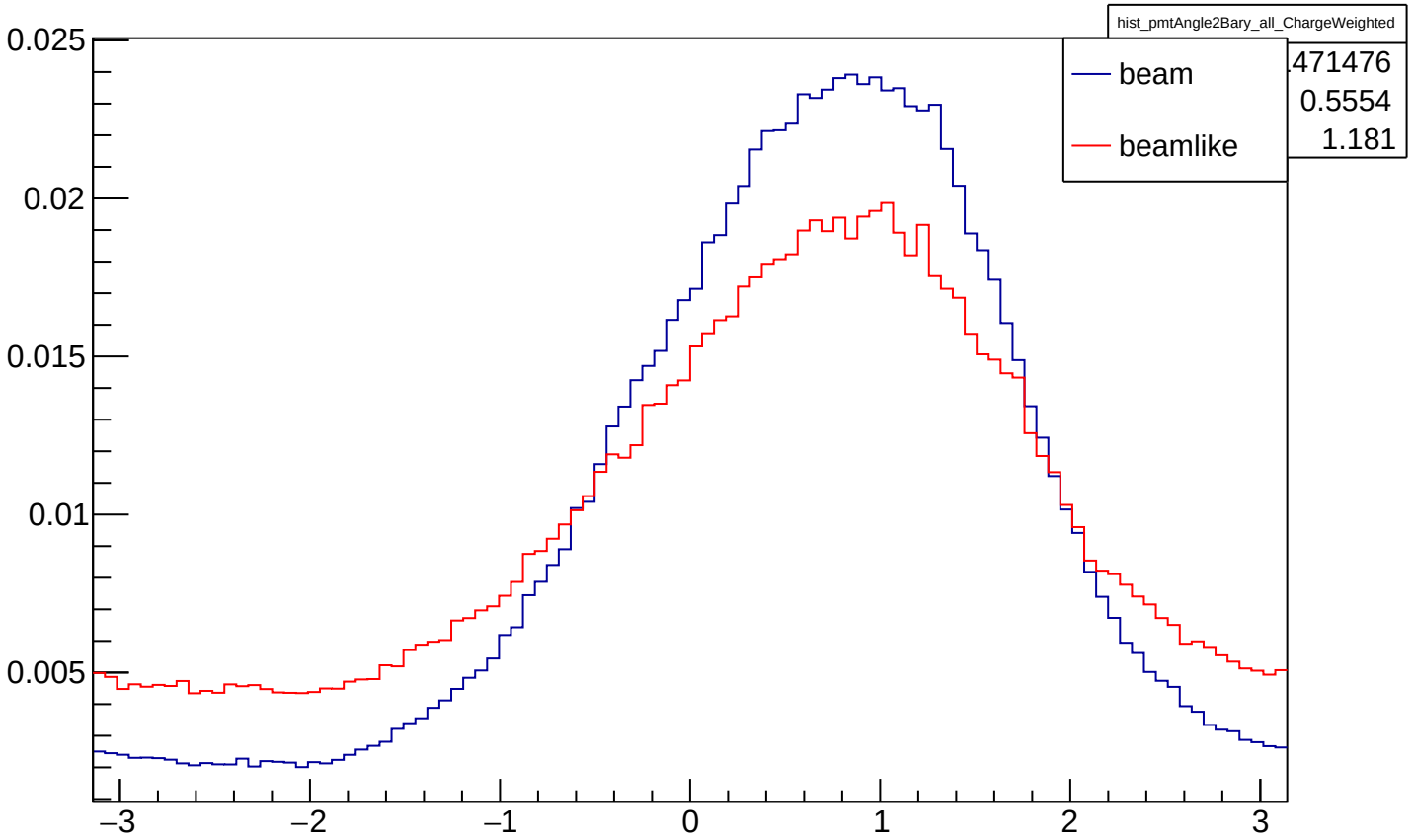

Angular distribution w.r.t. barycenter
hist_pmtAngleBary_all
beam
beamlike
471476
0.4426
0.3385
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.5
1
1.5
2
2.5
3

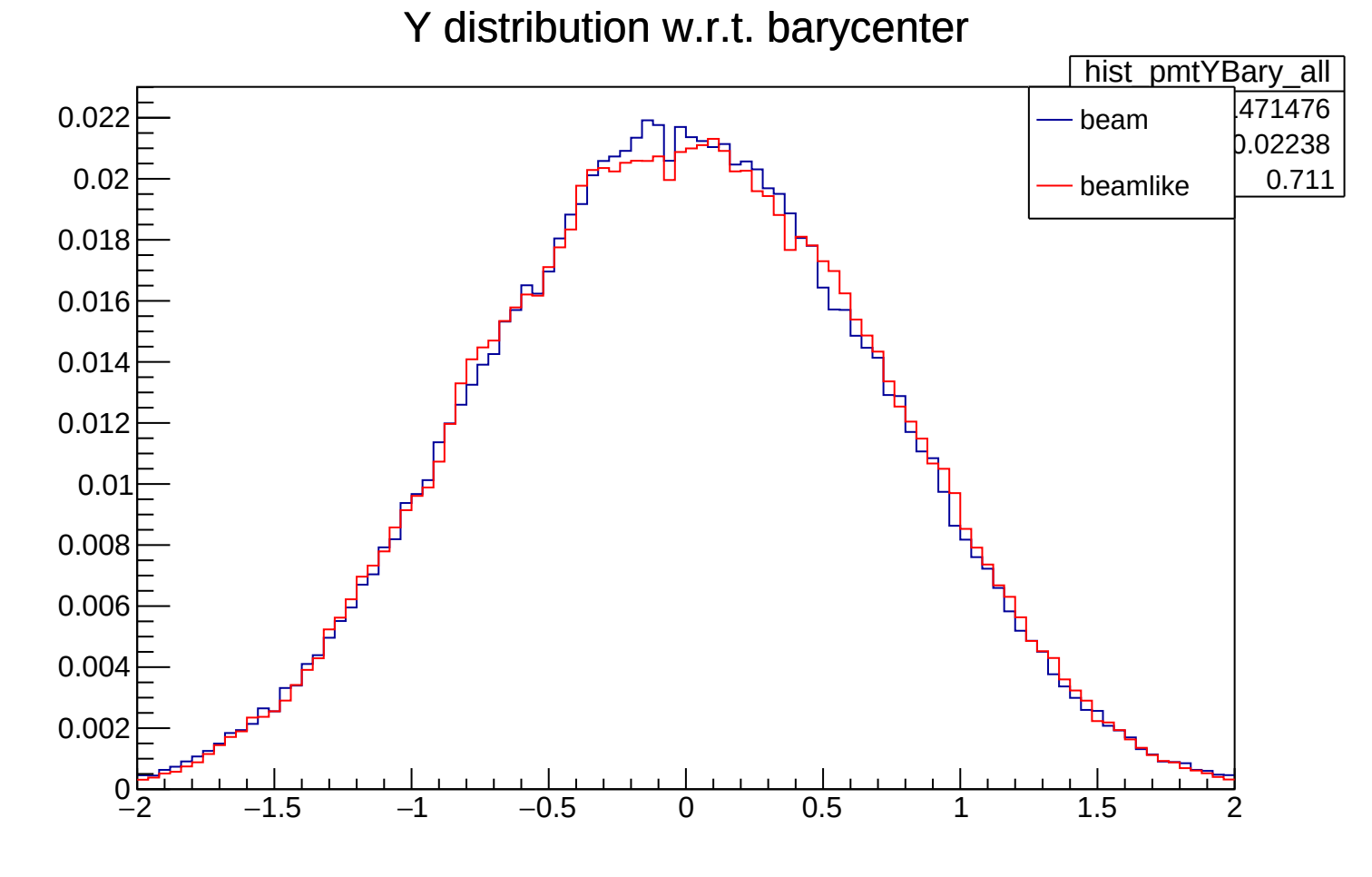

Charge weighted angular distribution w.r.t. barycenter
hist_pmtAngleBary_all_ChargeWeighted
beam
beamlike
.471476
0.3094
0.2524
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1
1.5
2
2.5
3

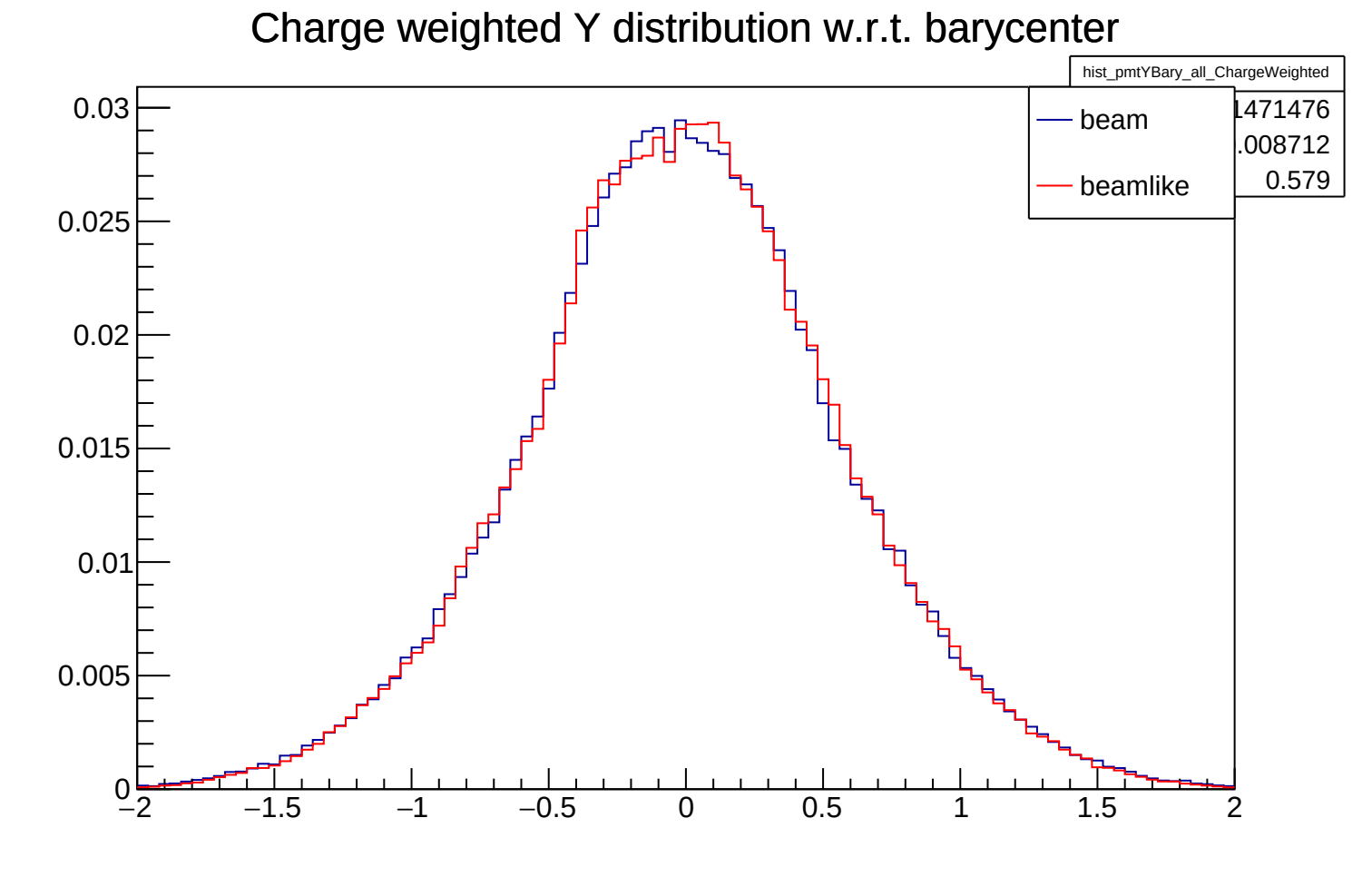
Angular distribution w.r.t. barycenter (II)

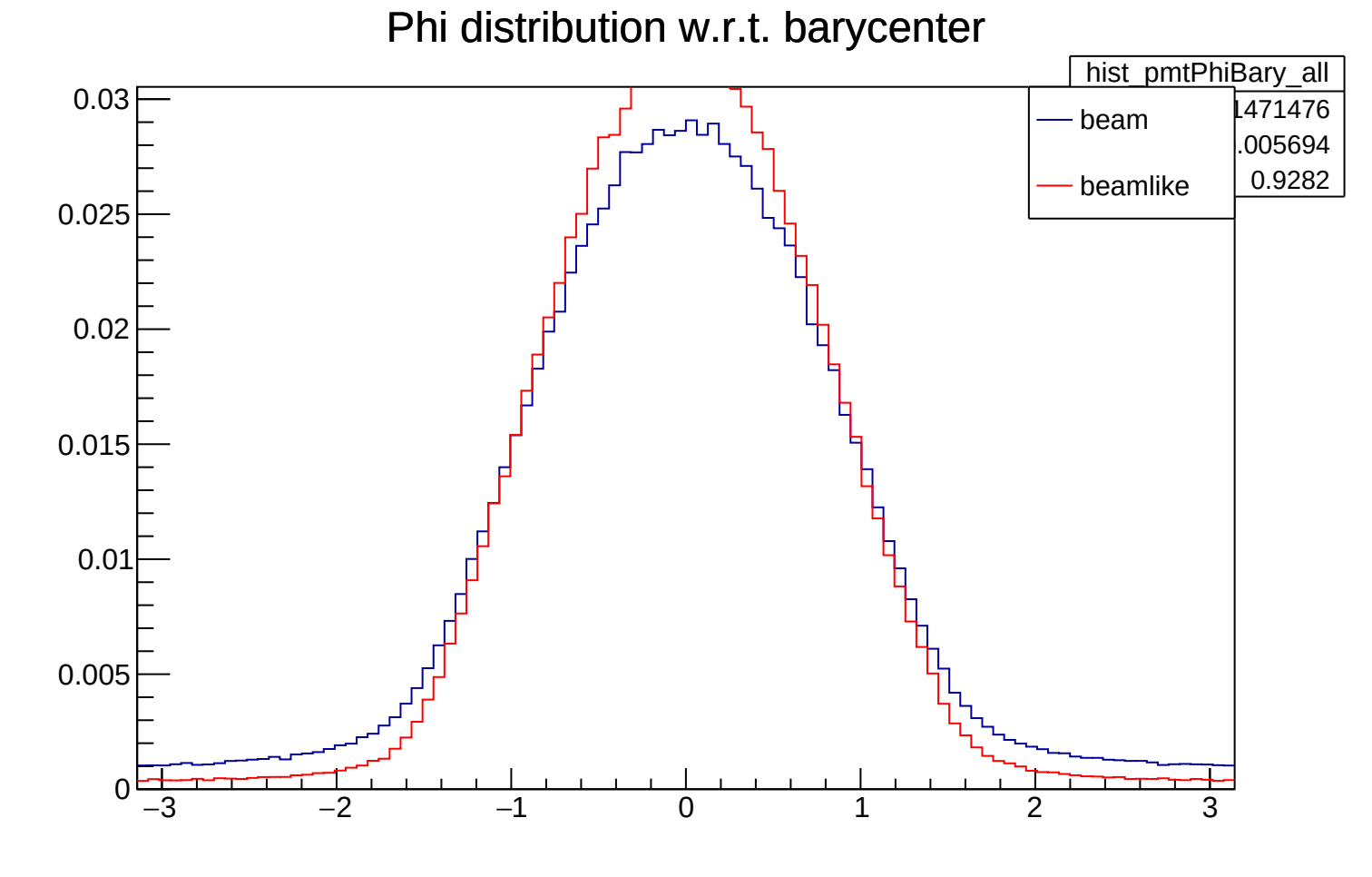


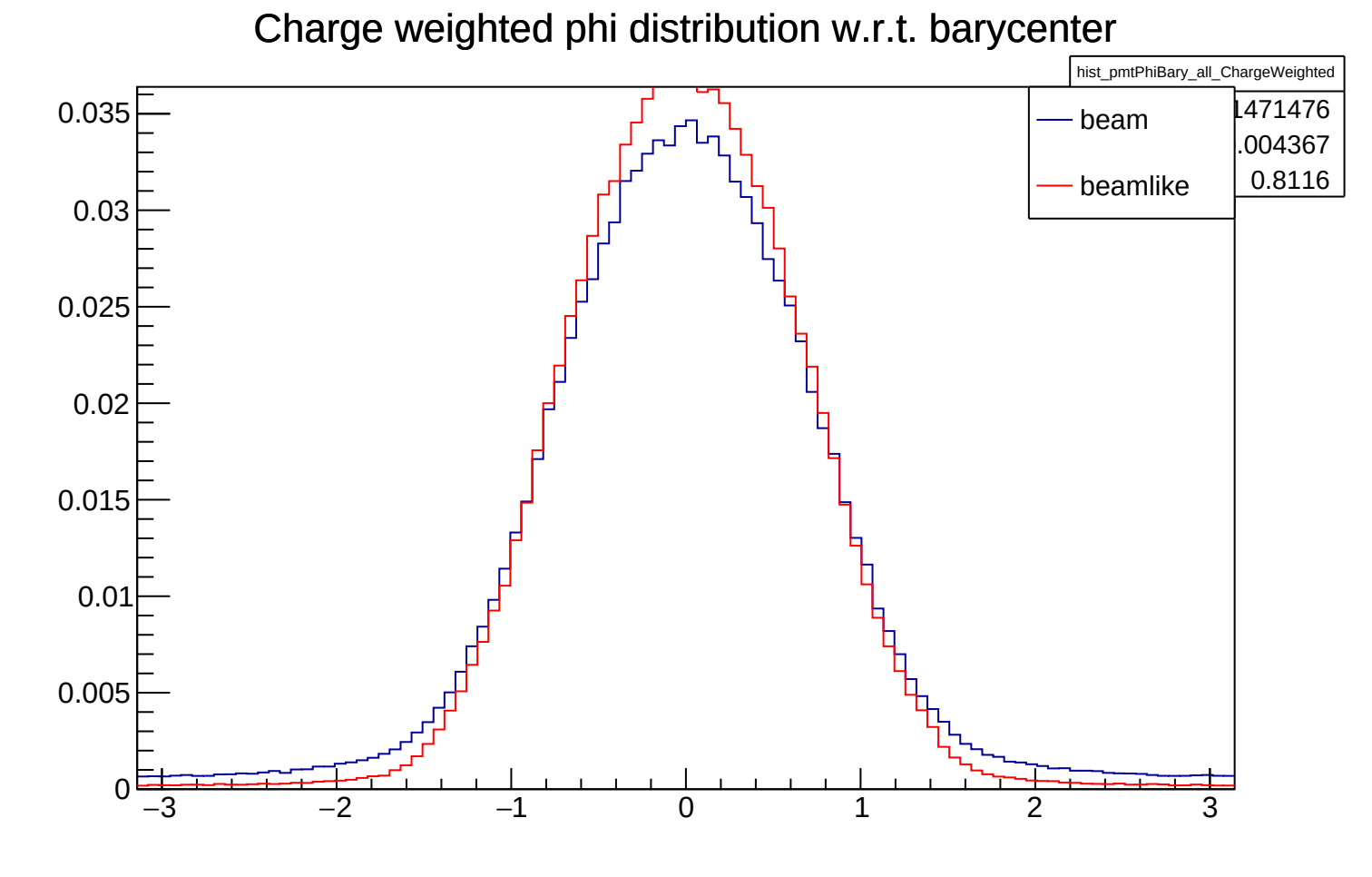
Charge weighted angular distribution w.r.t. barycenter (II)

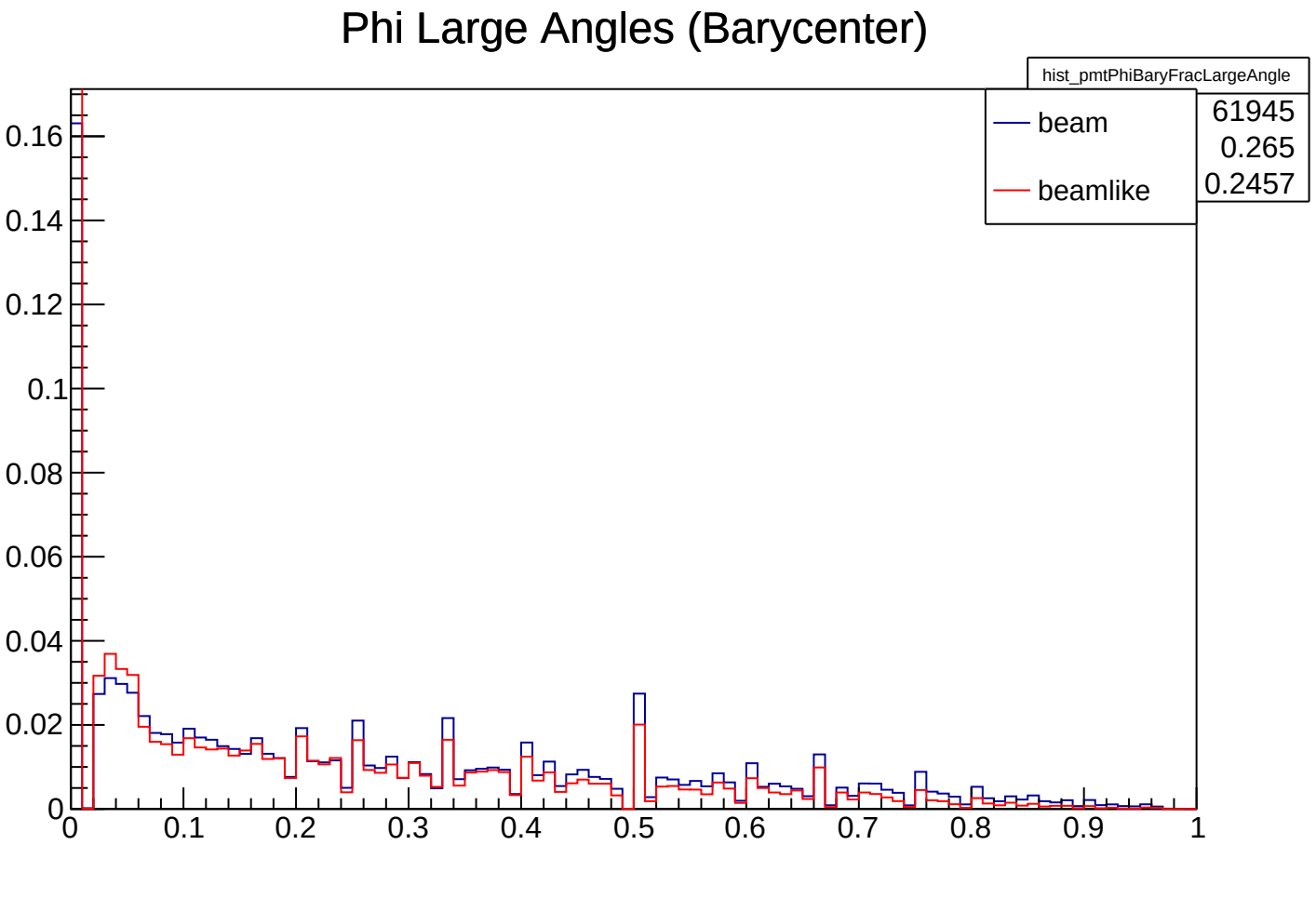


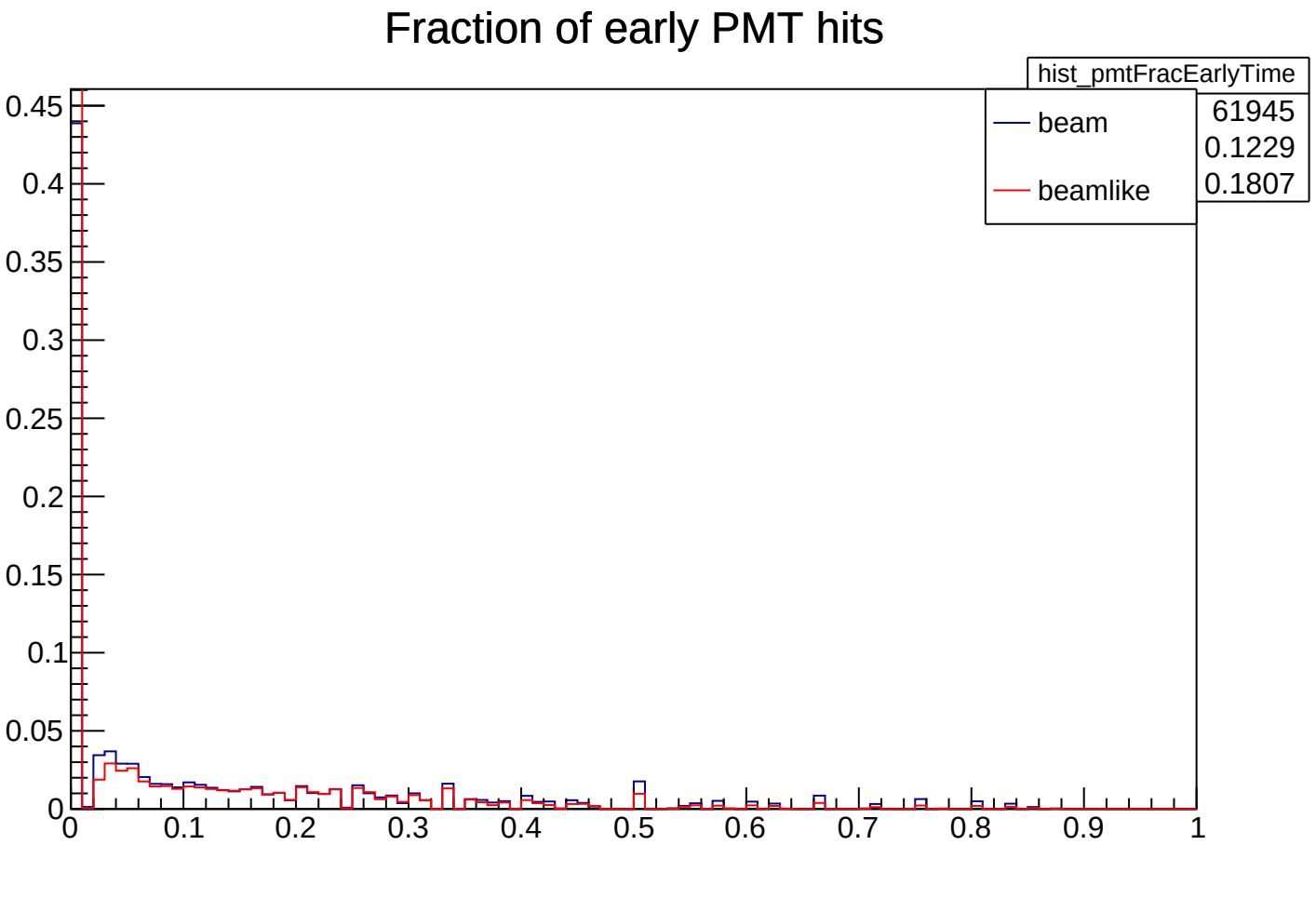

Y distribution w.r.t. barycenter
hist_pmtYBary_all
beam
beamlike
0.022
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

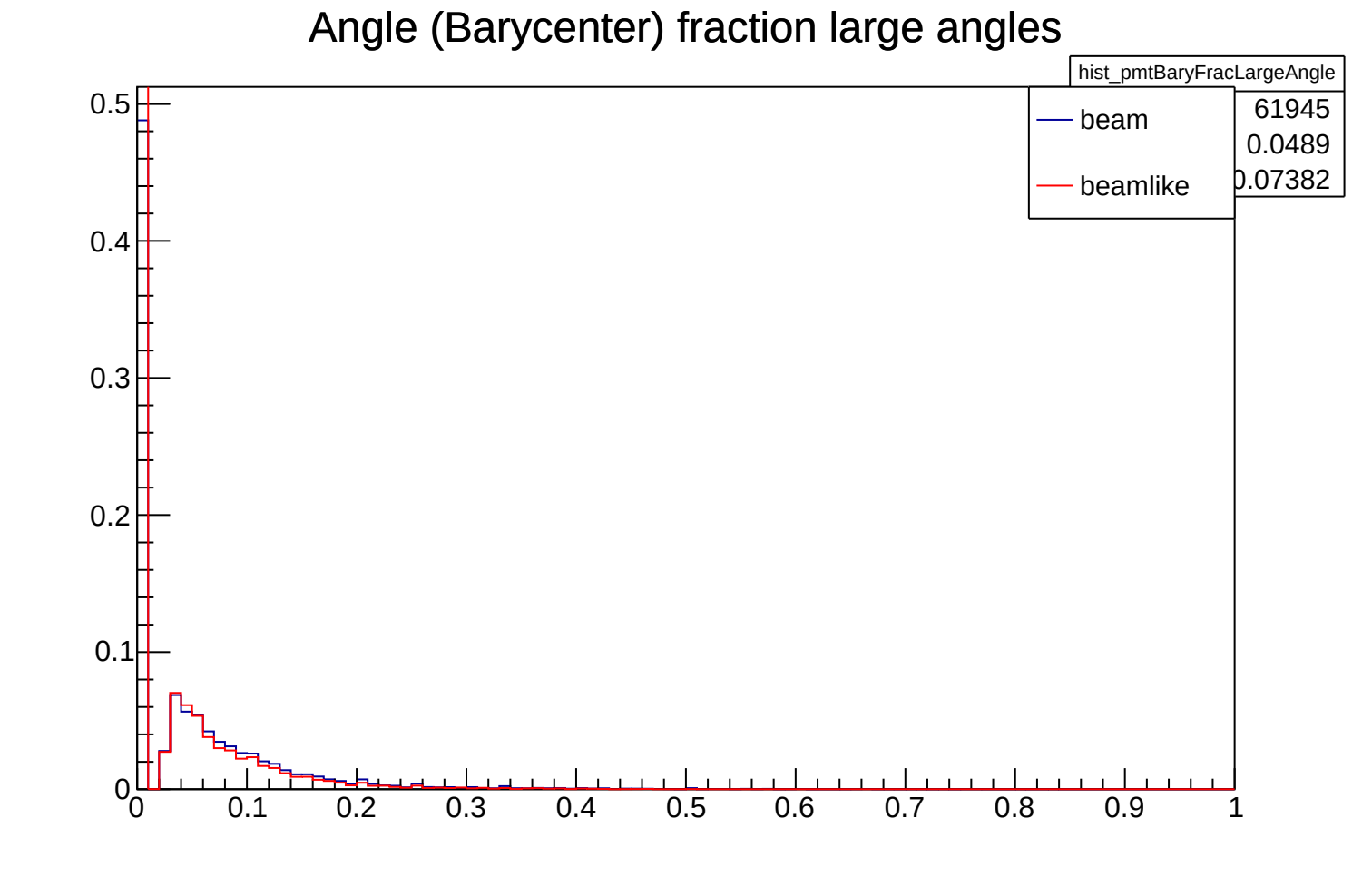

Charge weighted Y distribution w.r.t. barycenter
hist_pmtYBary_all_ChargeWeighted
beam
beamlike
1471476
.008712
0.579
0.03
0.025
0.02
0.015
0.01
0.005
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

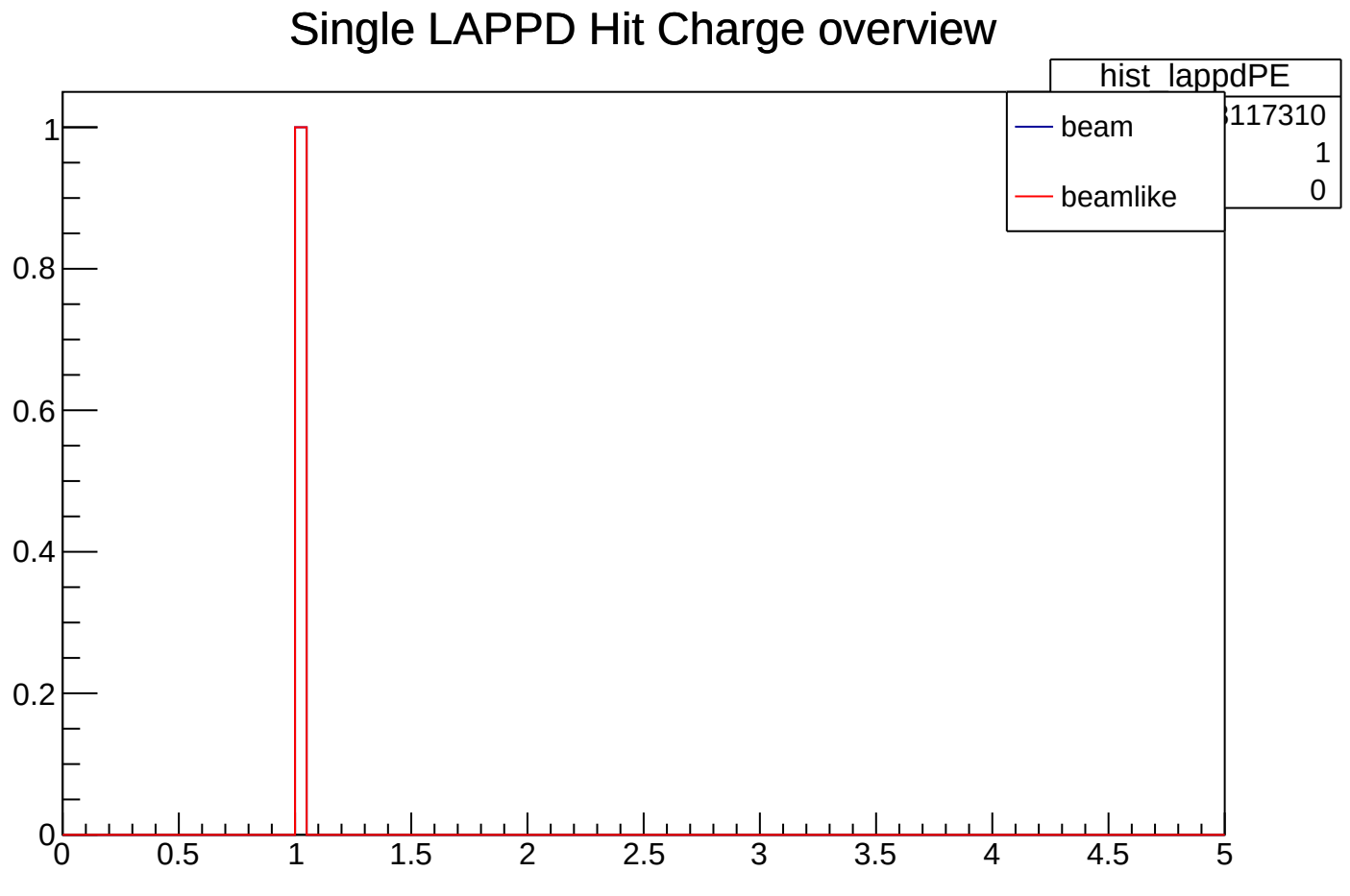

Phi distribution w.r.t. barycenter
hist_pmtPhiBary_all
beam
beamlike
1471476
.005694
0.9282
0.03
0.025
0.02
0.015
0.01
0.005
0
−3
−2
−1
0
1
2
3

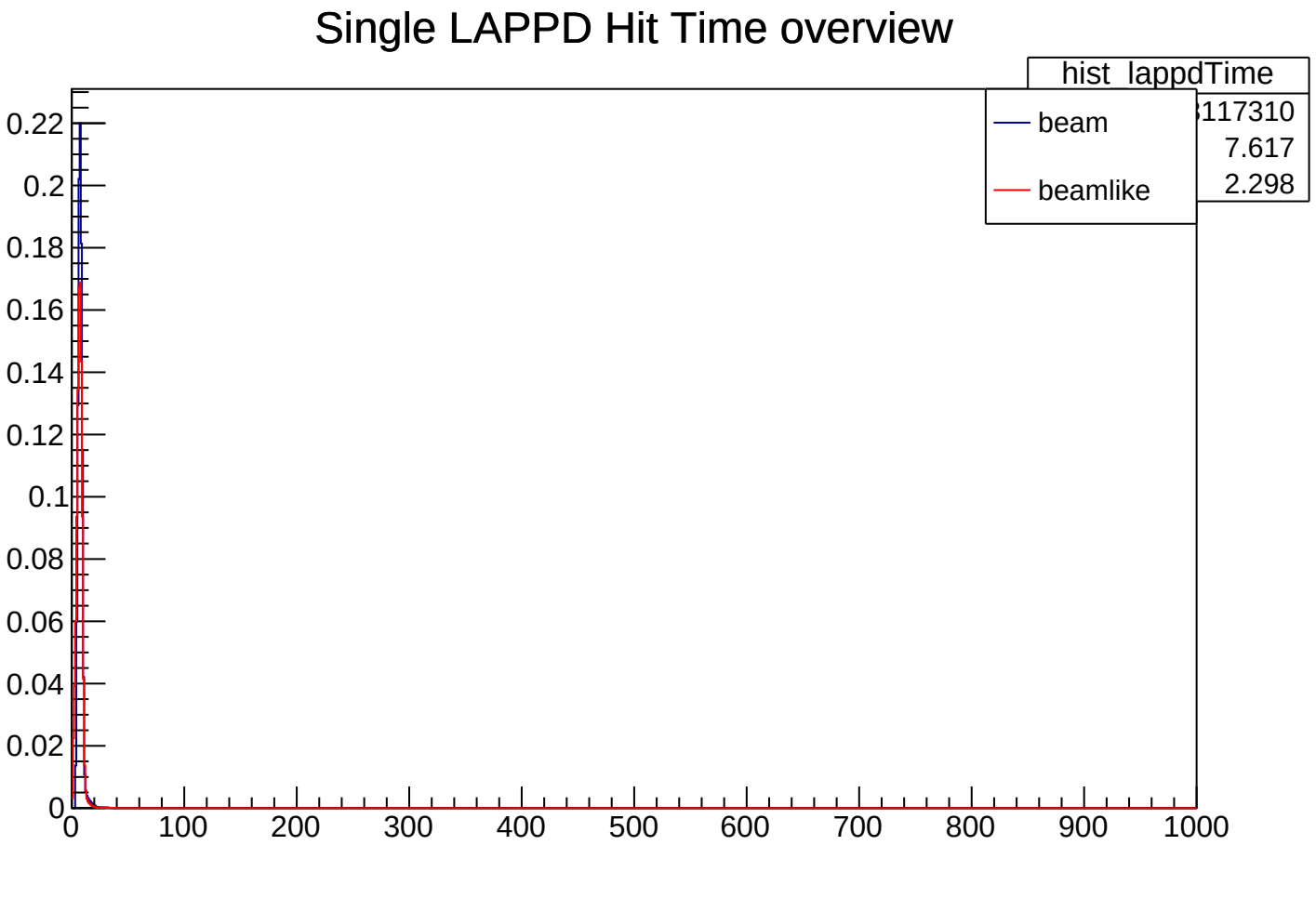

Charge weighted phi distribution w.r.t. barycenter
hist_pmtPhiBary_all_ChargeWeighted
beam
beamlike
1471476
.004367
0.8116
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
−3
−2
−1
0
1
2
3

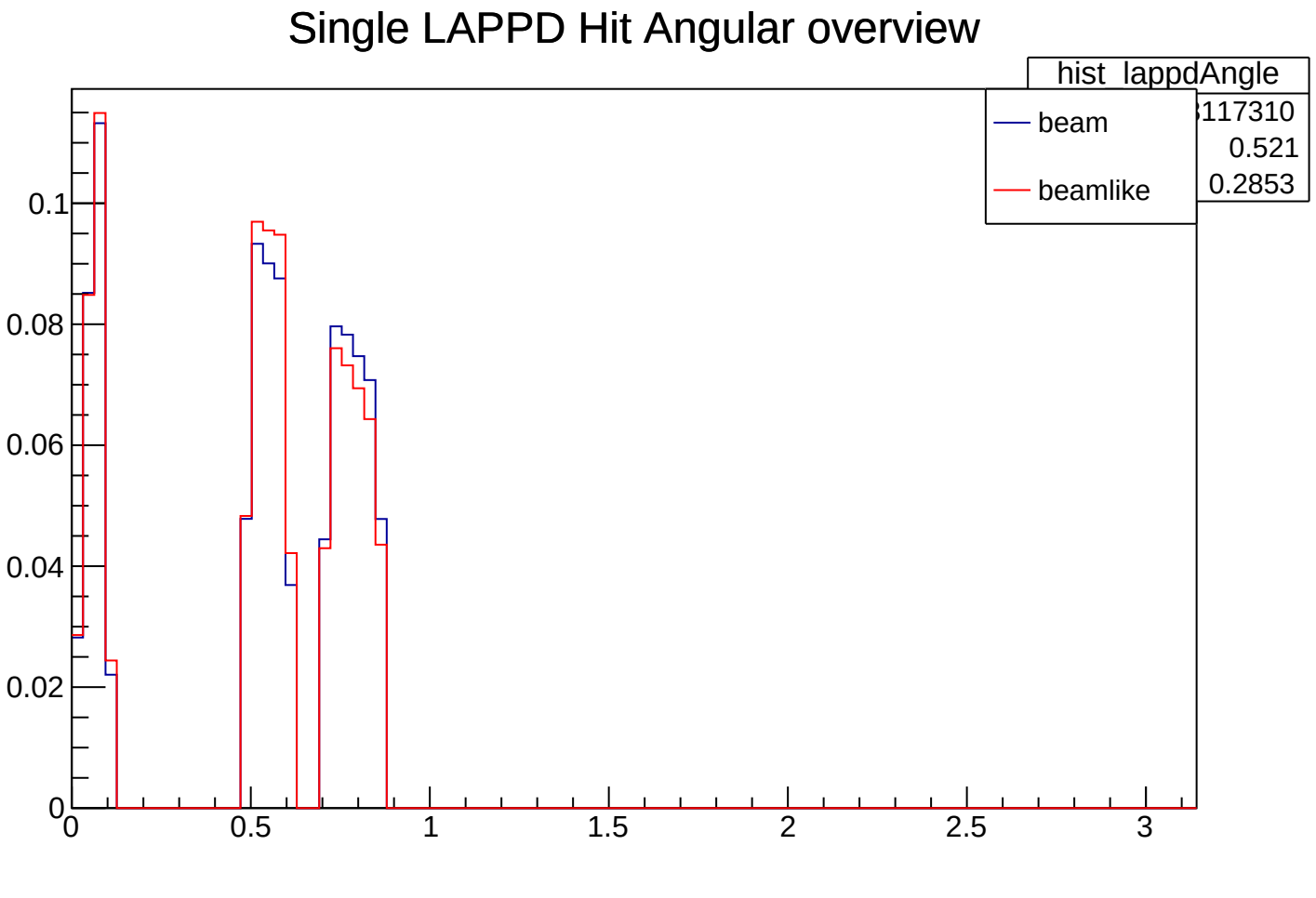

Phi Large Angles (Barycenter)
hist_pmtPhiBaryFracLargeAngle
beam
beamlike
61945
0.265
0.2457
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

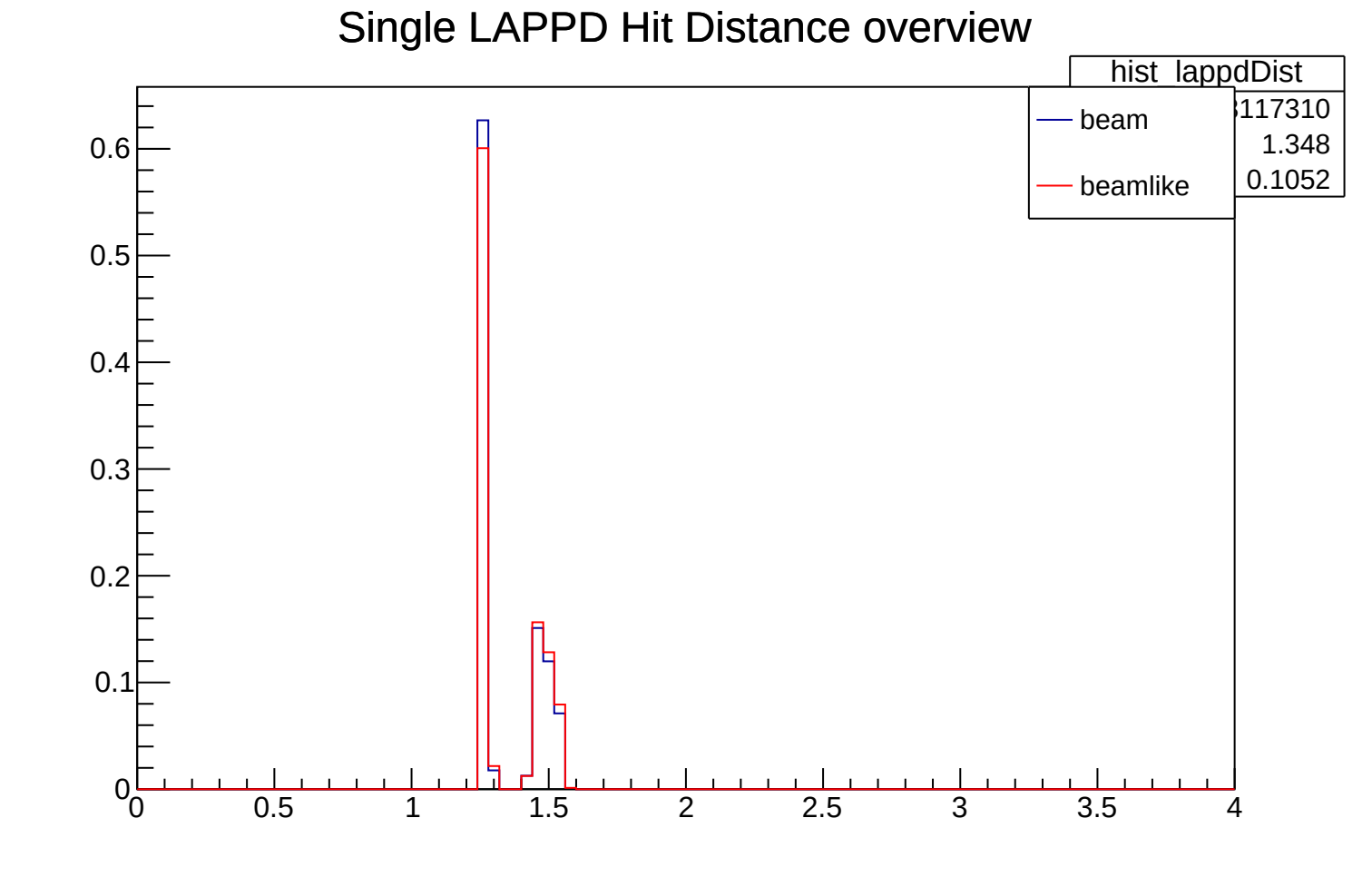

Fraction of early PMT hits
hist_pmtFracEarlyTime
beam
beamlike
61945
0.1229
0.1807
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

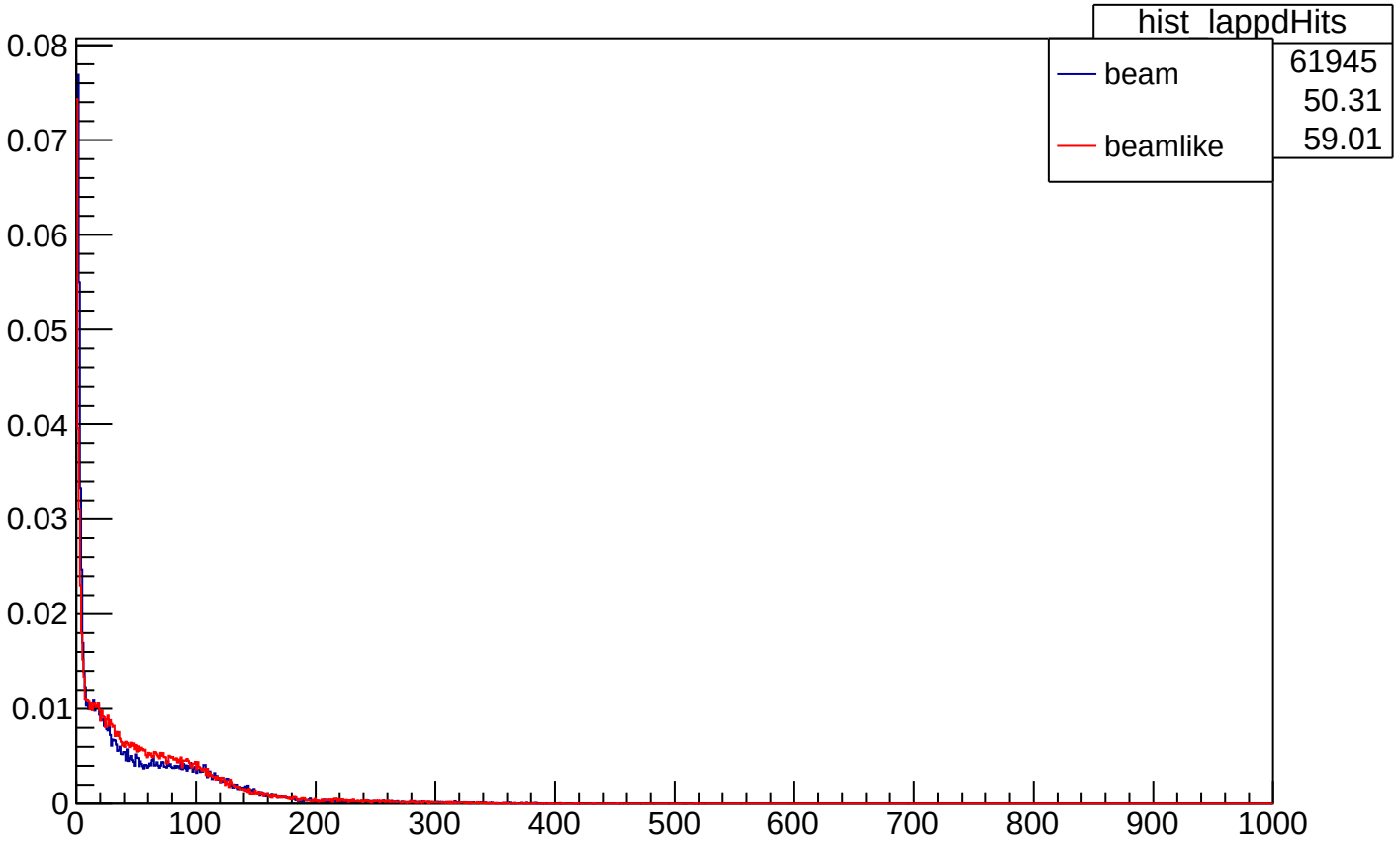

Angle (Barycenter) fraction large angles
hist_pmtBaryFracLargeAngle
beam
beamlike
61945
0.0489
0.07382
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

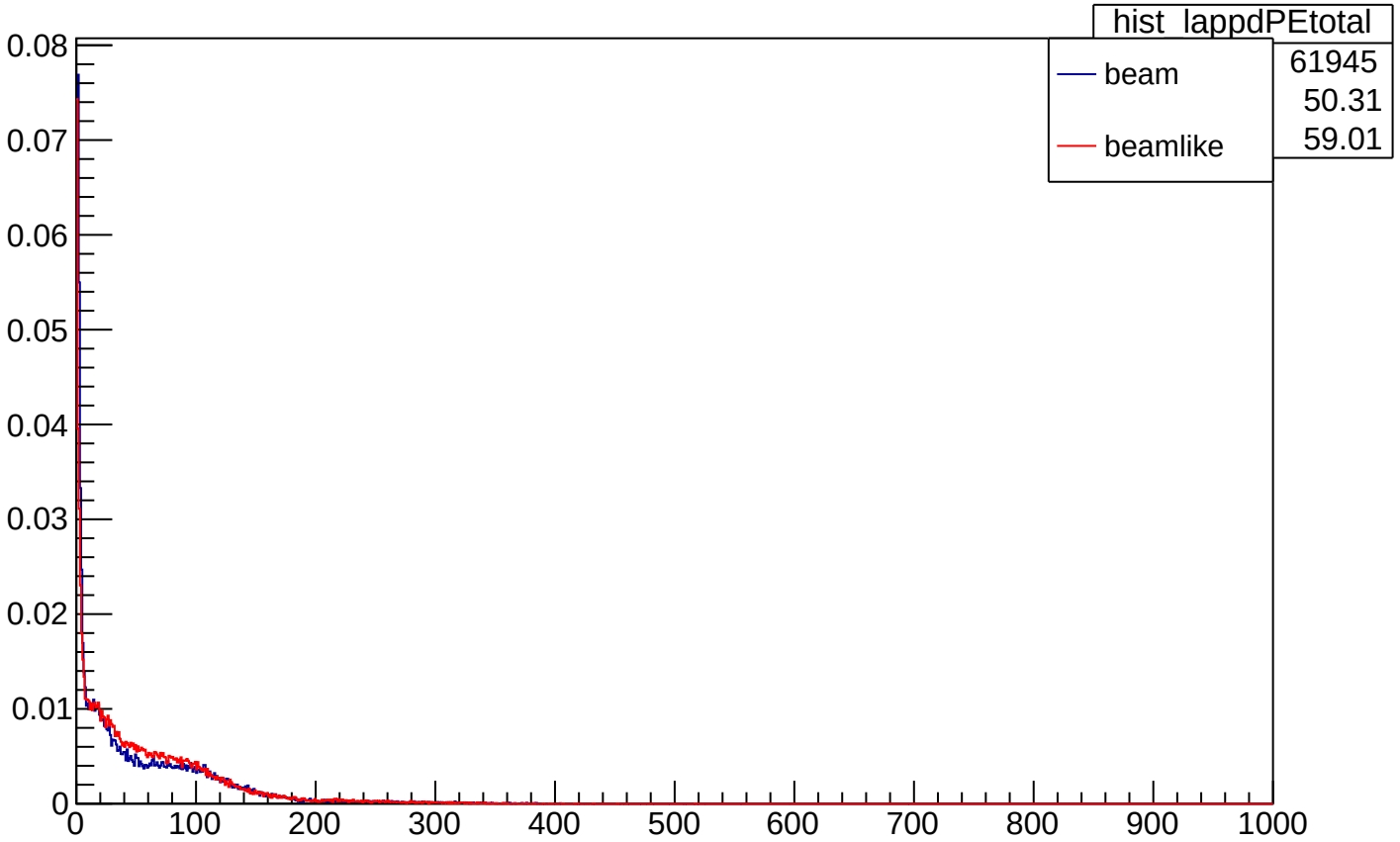

Single LAPPD Hit Charge overview
hist_lappdPE
117310
1
0
beam
beamlike
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

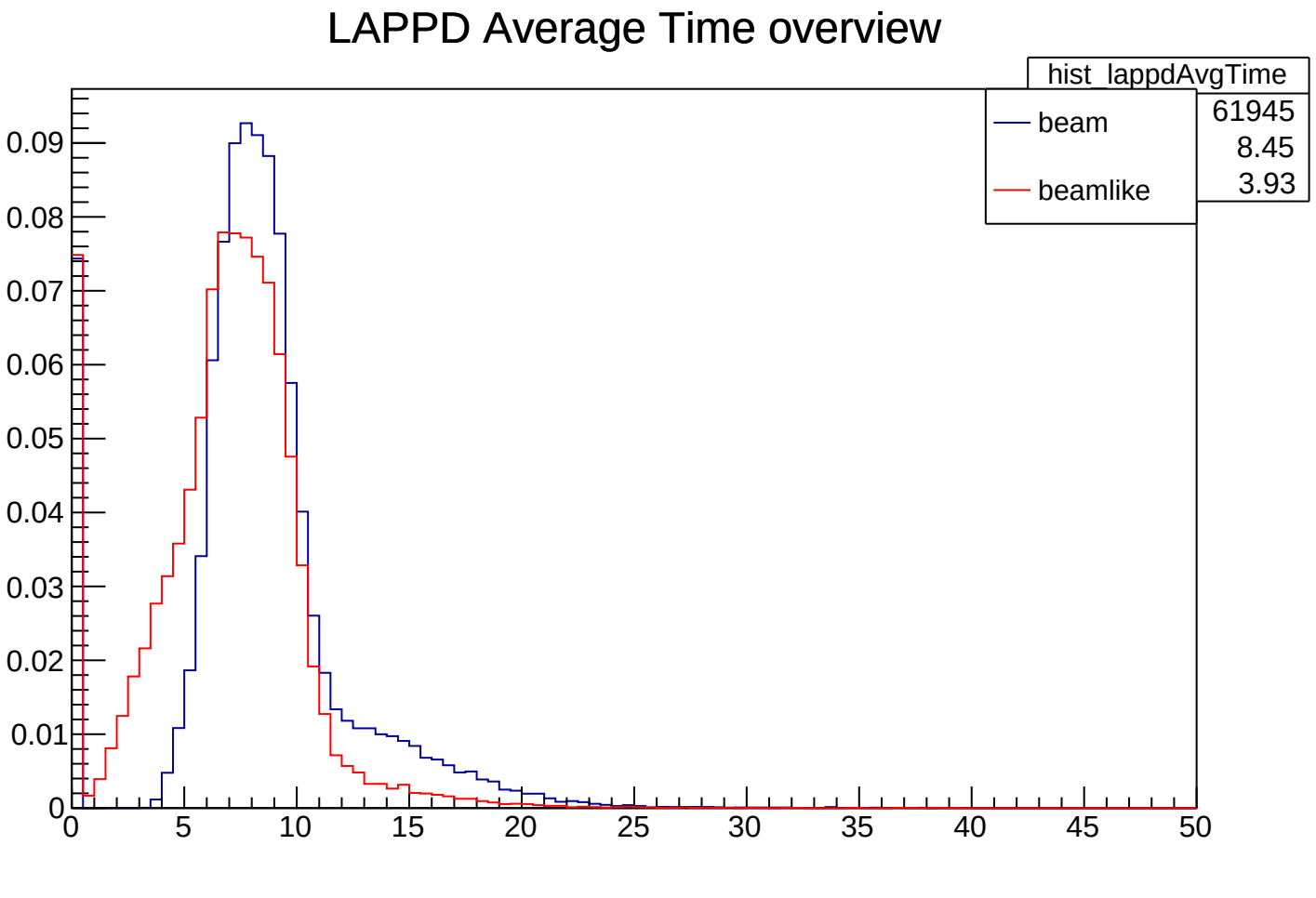

Single LAPPD Hit Time overview
hist_lappdTime
beam
beamlike
117310
7.617
2.298
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
100
200
300
400
500
600
700
800
900
1000

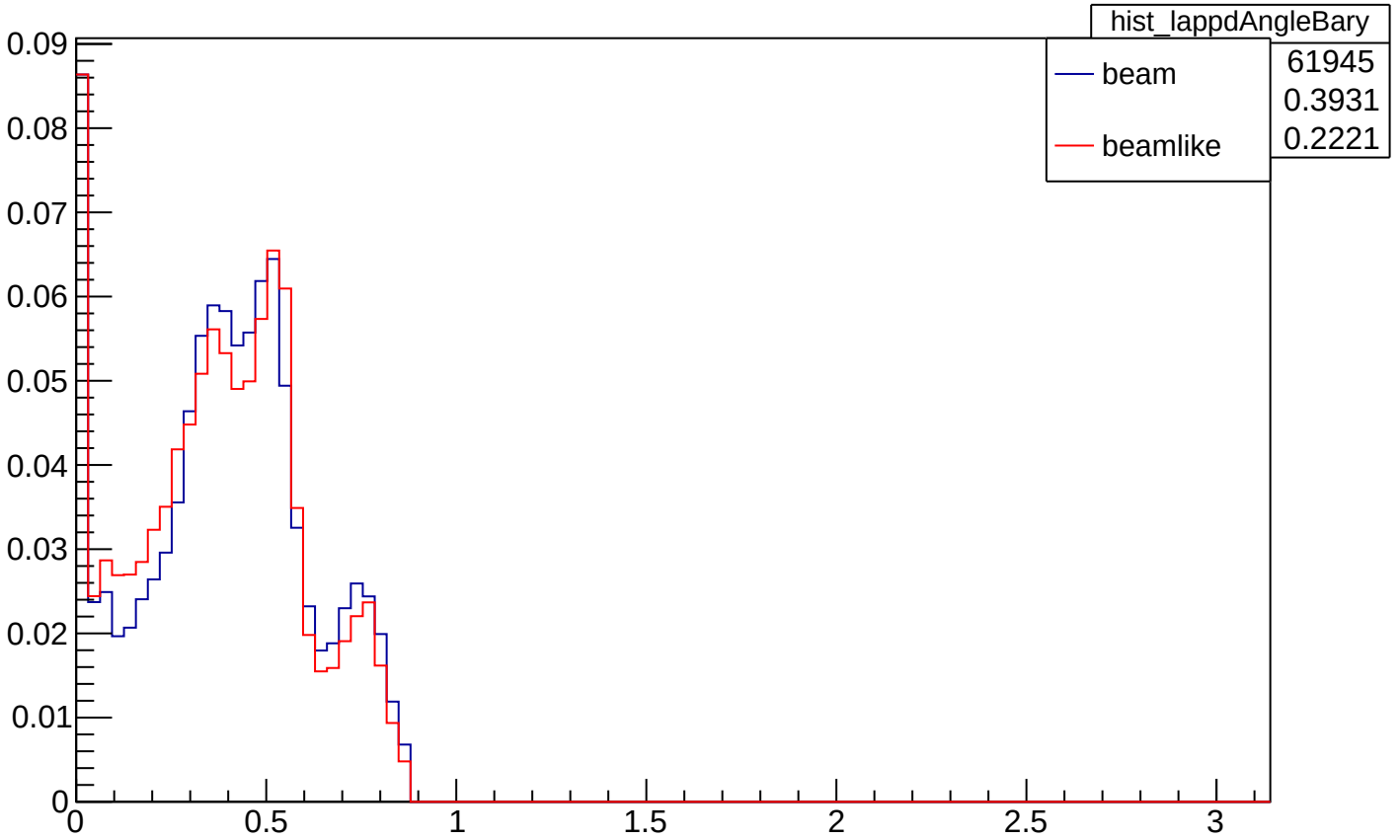

Single LAPPD Hit Angular overview
hist_lappdAngle
beam
beamlike
117310
0.521
0.2853
0.1
0.08
0.06
0.04
0.02
0
0
0.5
1
1.5
2
2.5
3

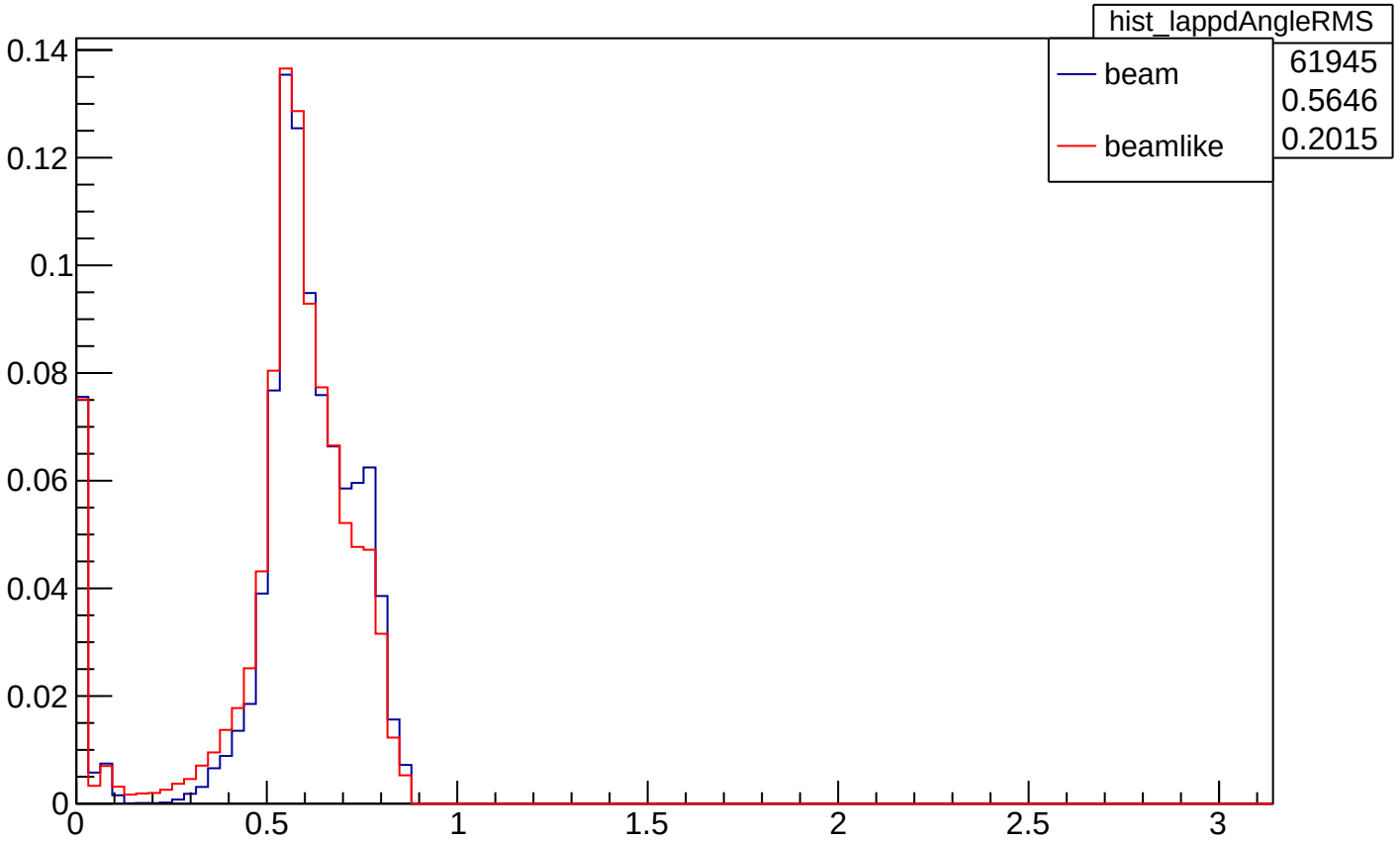

Single LAPPD Hit Distance overview
hist_lappdDist
beam
beamlike
117310
1.348
0.1052
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.5
1
1.5
2
2.5
3
3.5
4

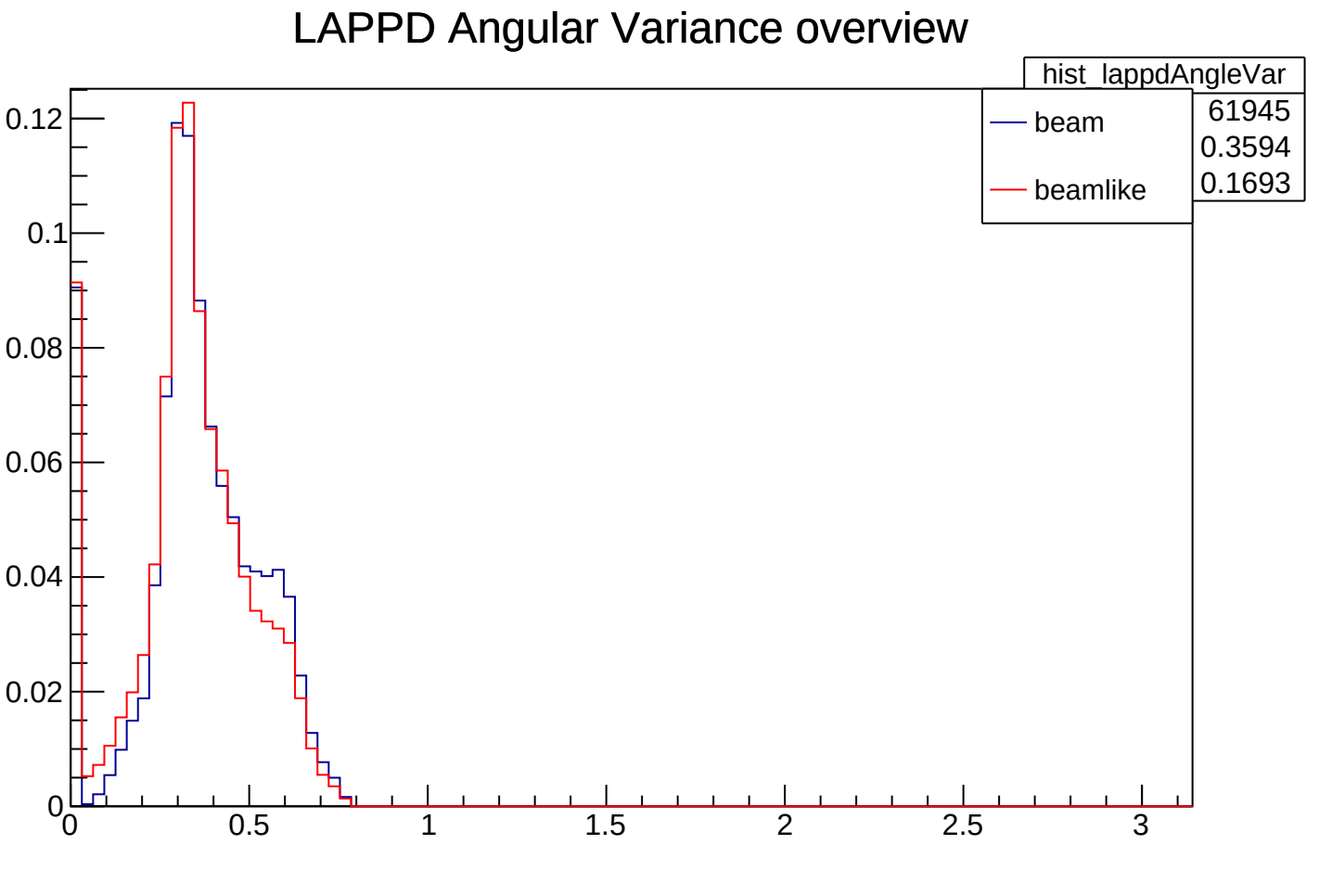

Number LAPPD Hits overview
hist_lappdHits
61945
50.31
59.01
beam
beamlike
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
100
200
300
400
500
600
700
800
900
1000

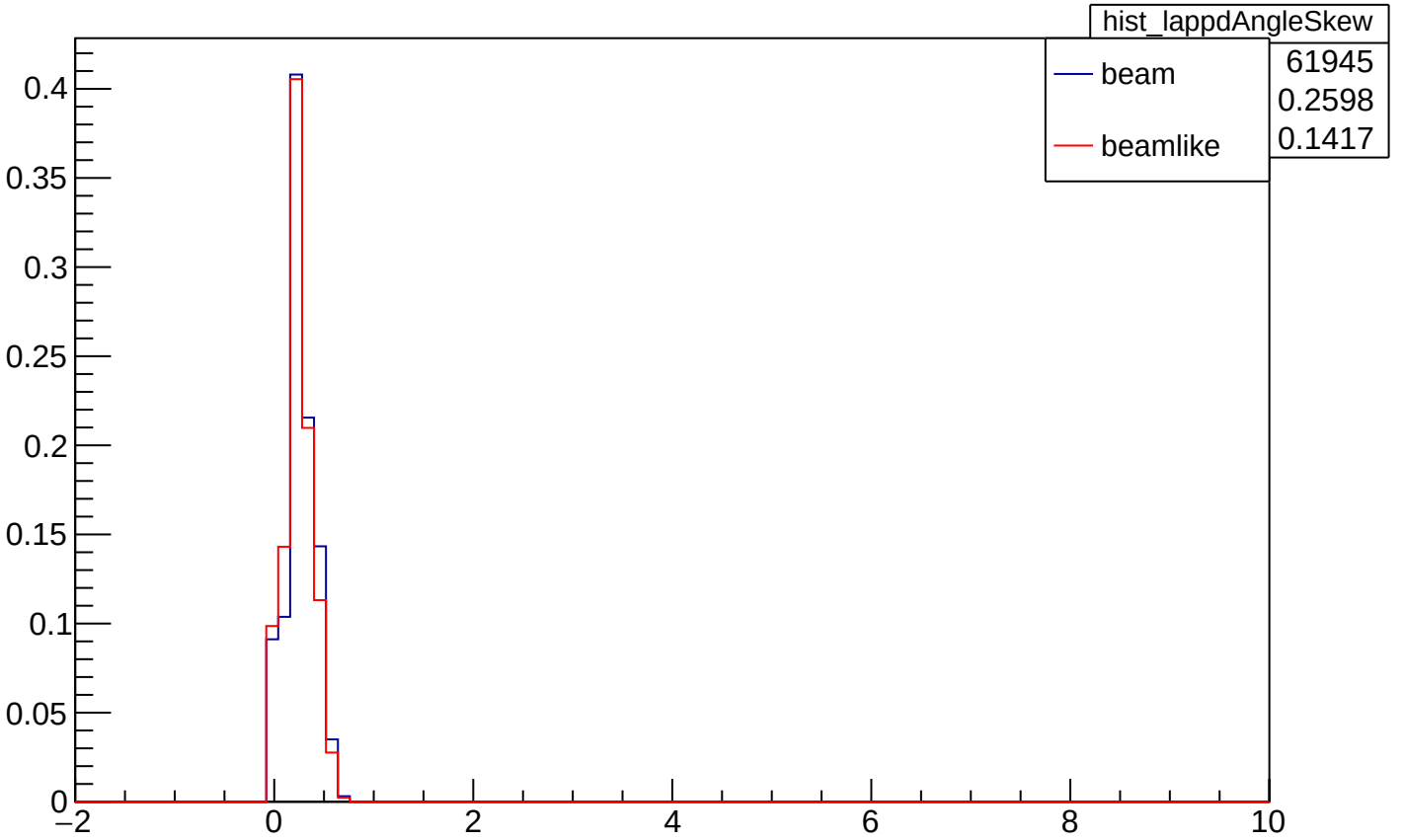

LAPPD Total Charge overview
hist lappdPEtotal
61945
50.31
59.01
beam
beamlike
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
100
200
300
400
500
600
700
800
900
1000

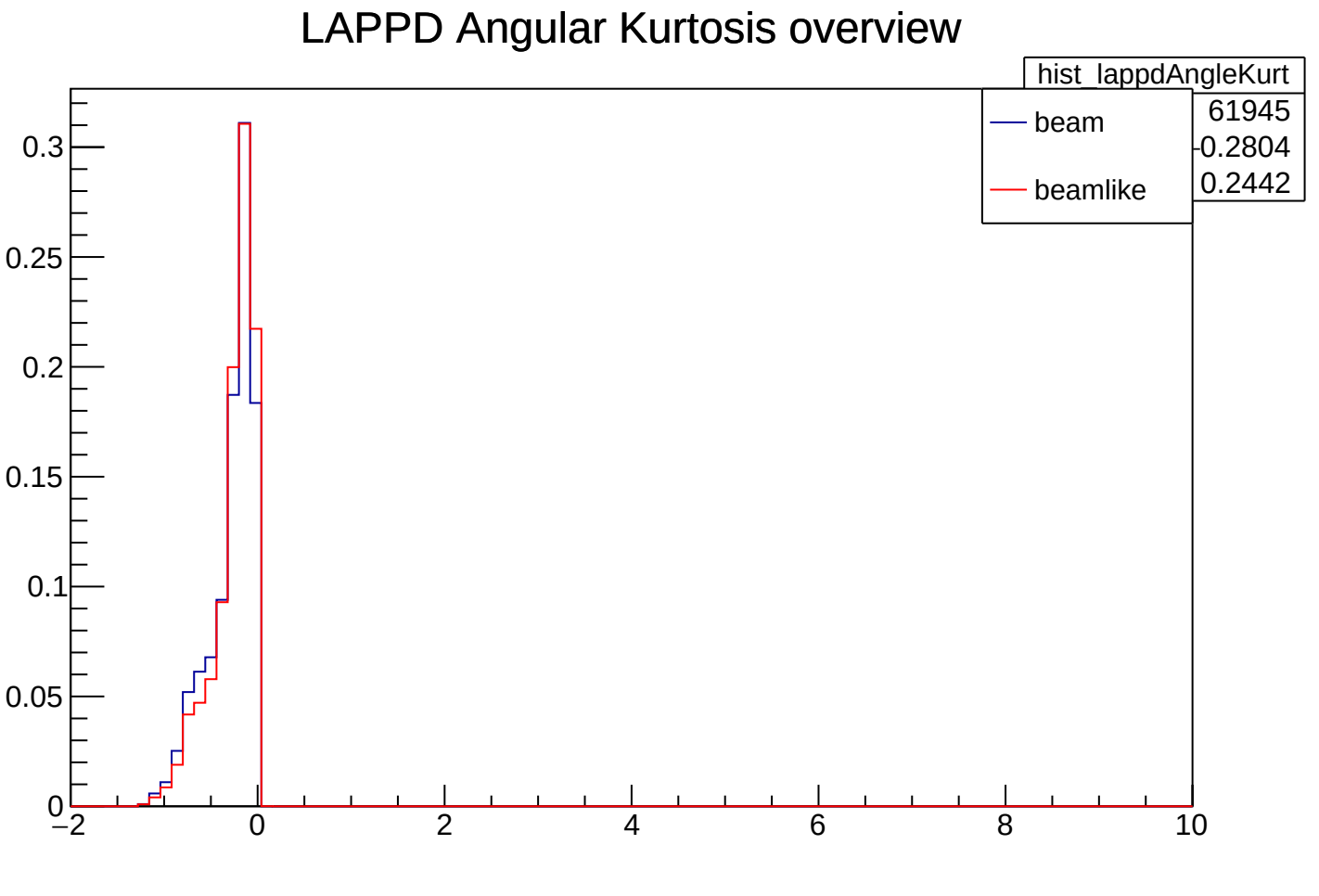

LAPPD Average Time overview
hist_lappdAvgTime
61945
8.45
3.93
beam
beamlike
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
5
10
15
20
25
30
35
40
45
50

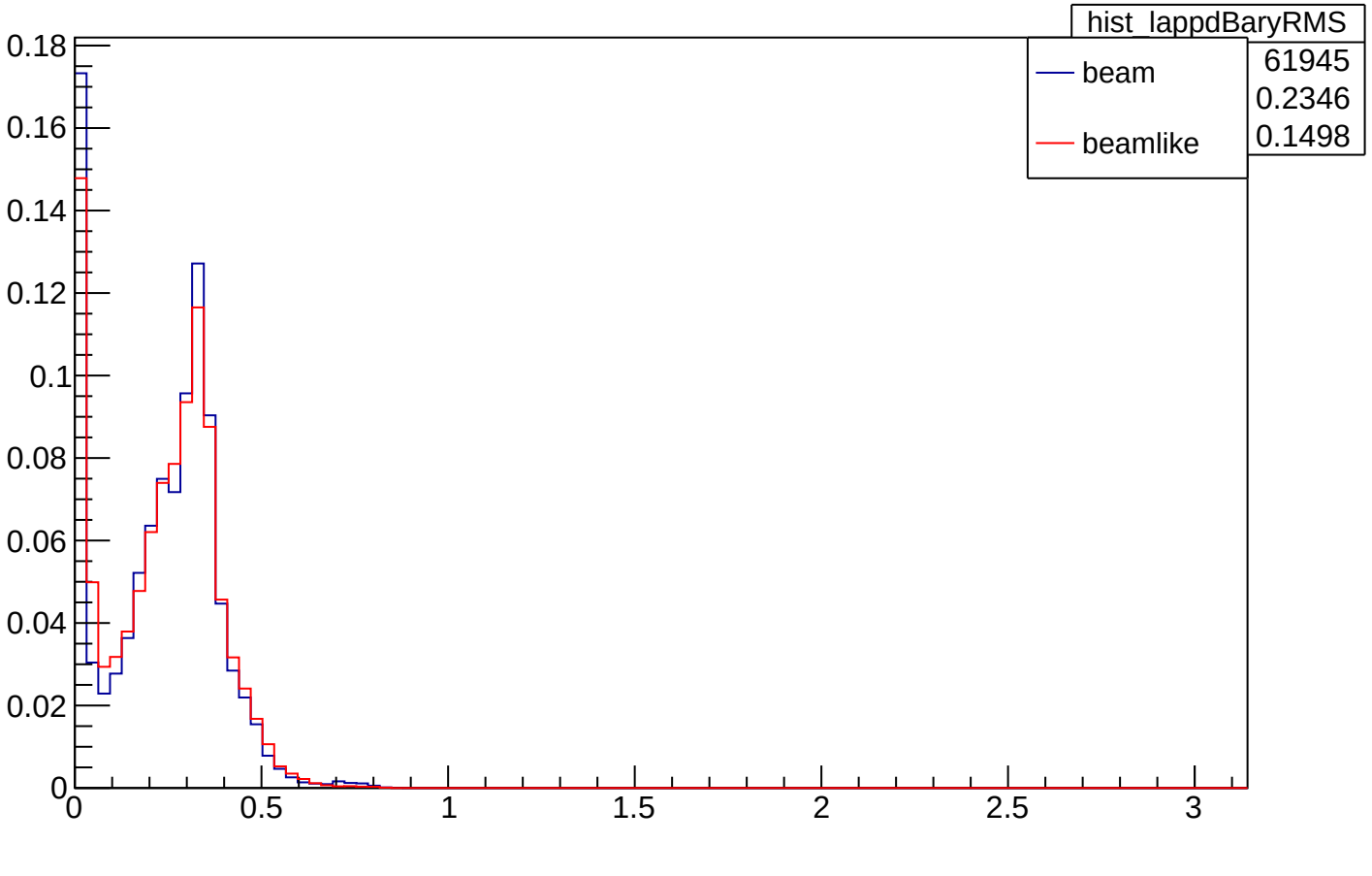

LAPPD Barycenter Angle overview
hist_lappdAngleBary
beam
beamlike
61945
0.3931
0.2221
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.5
1
1.5
2
2.5
3

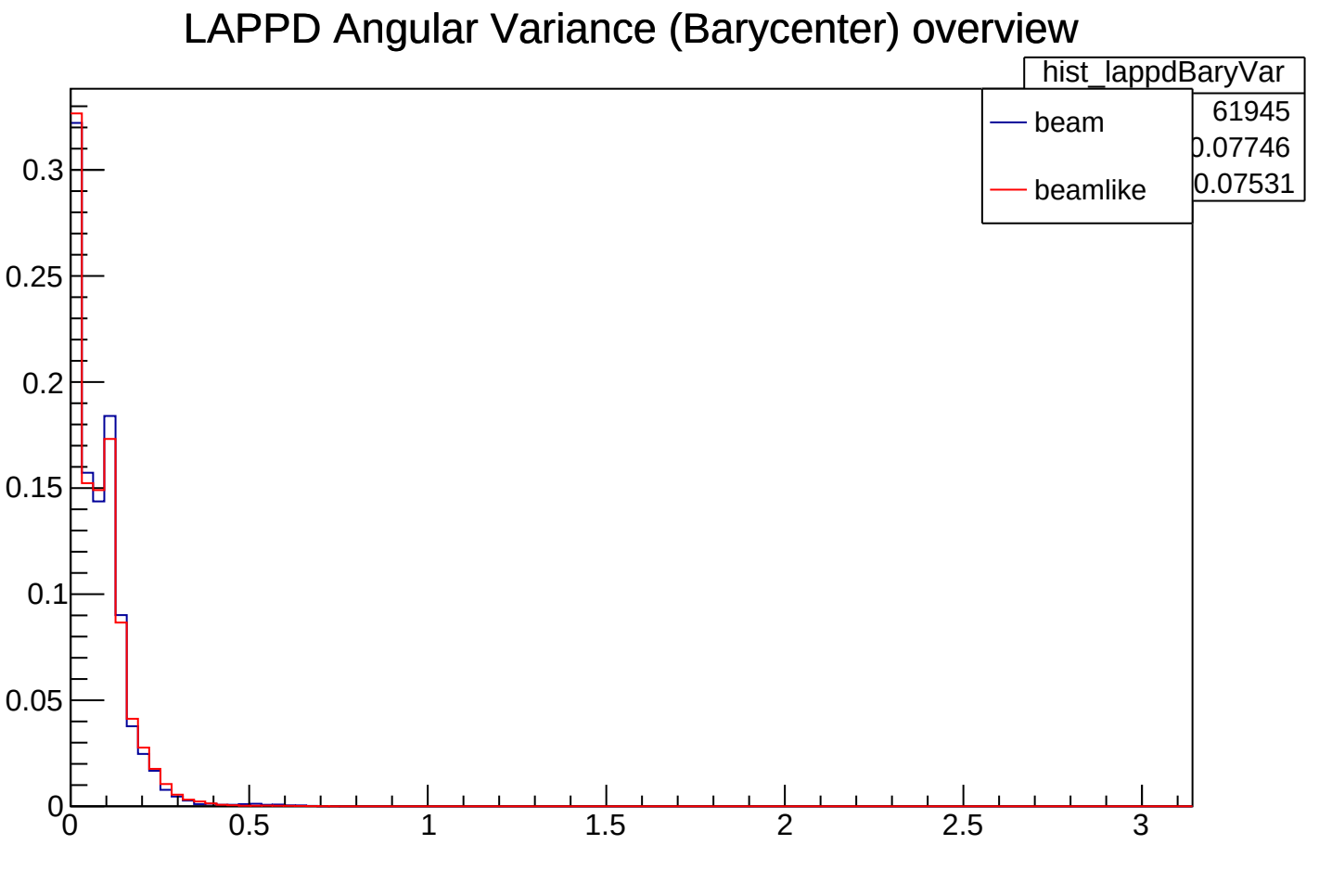

LAPPD Angular RMS overview
hist_lappdAngleRMS
beam
beamlike
61945
0.5646
0.2015
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.5
1
1.5
2
2.5
3

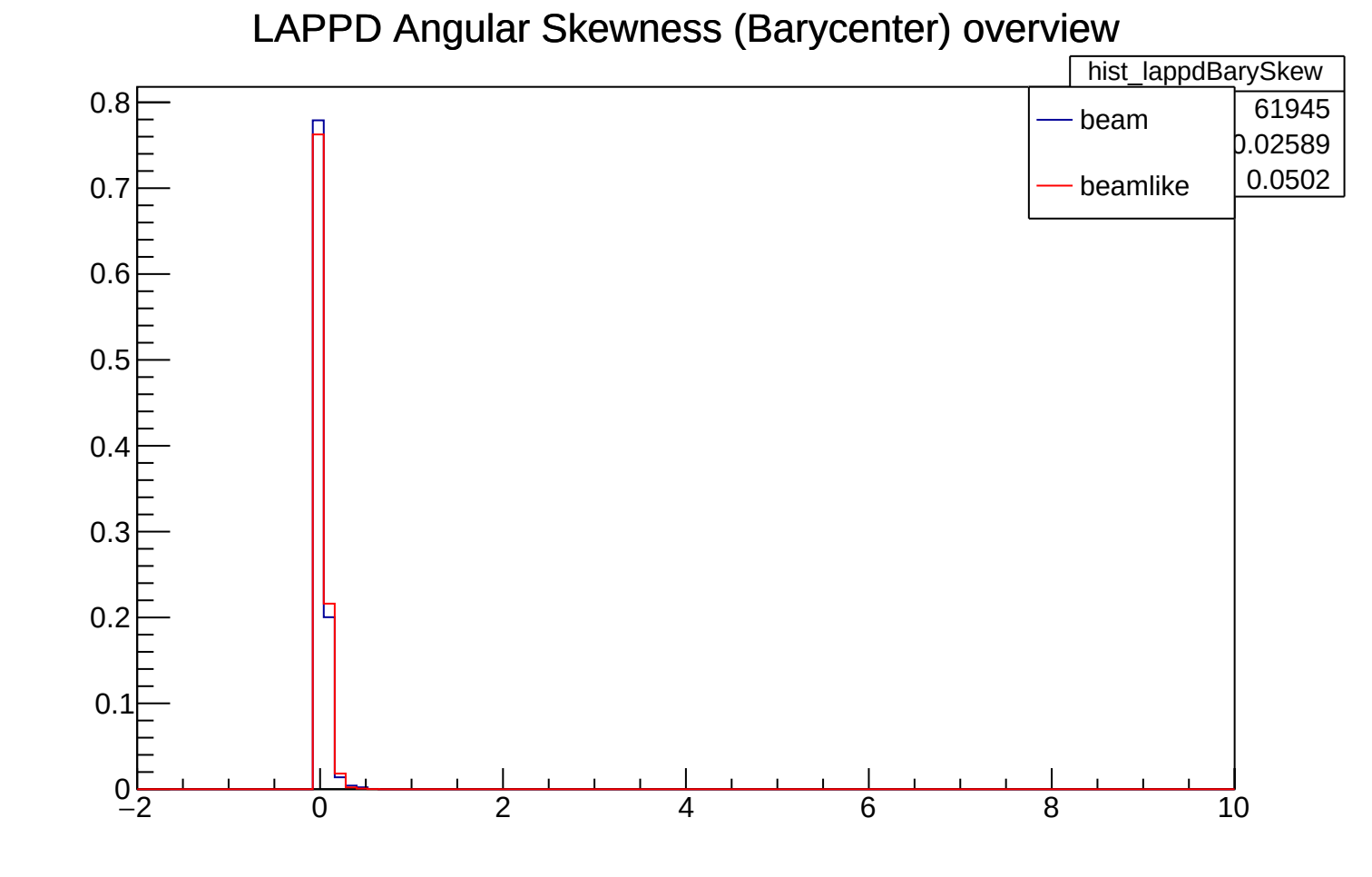

LAPPD Angular Variance overview
hist_lappdAngleVar
61945
0.3594
0.1693
beam
beamlike
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.5
1
1.5
2
2.5
3

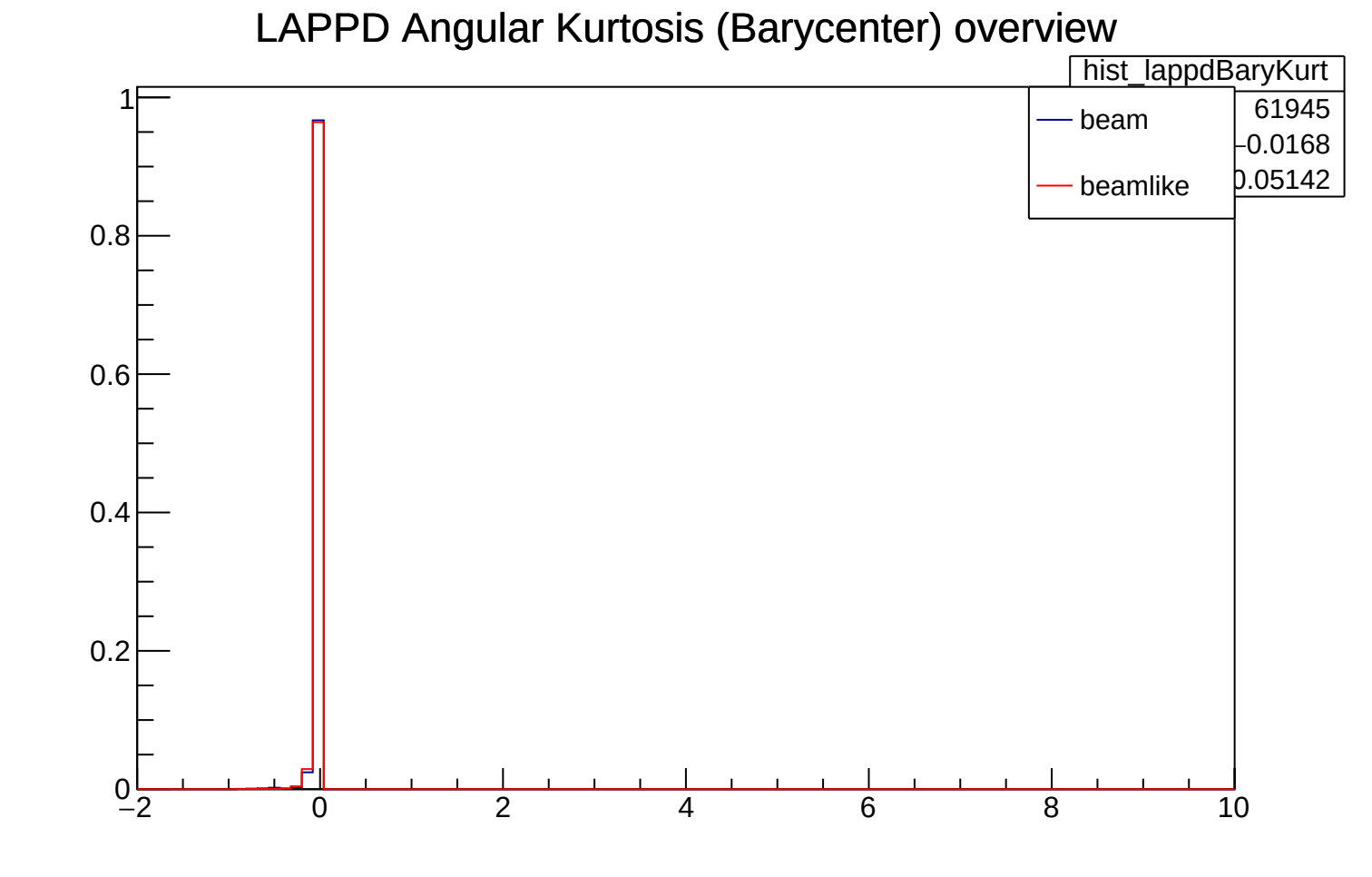

LAPPD Angular Skewness overview
hist_lappdAngleSkew
beam
beamlike
61945
0.2598
0.1417
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
−2
0
2
4
6
8
10

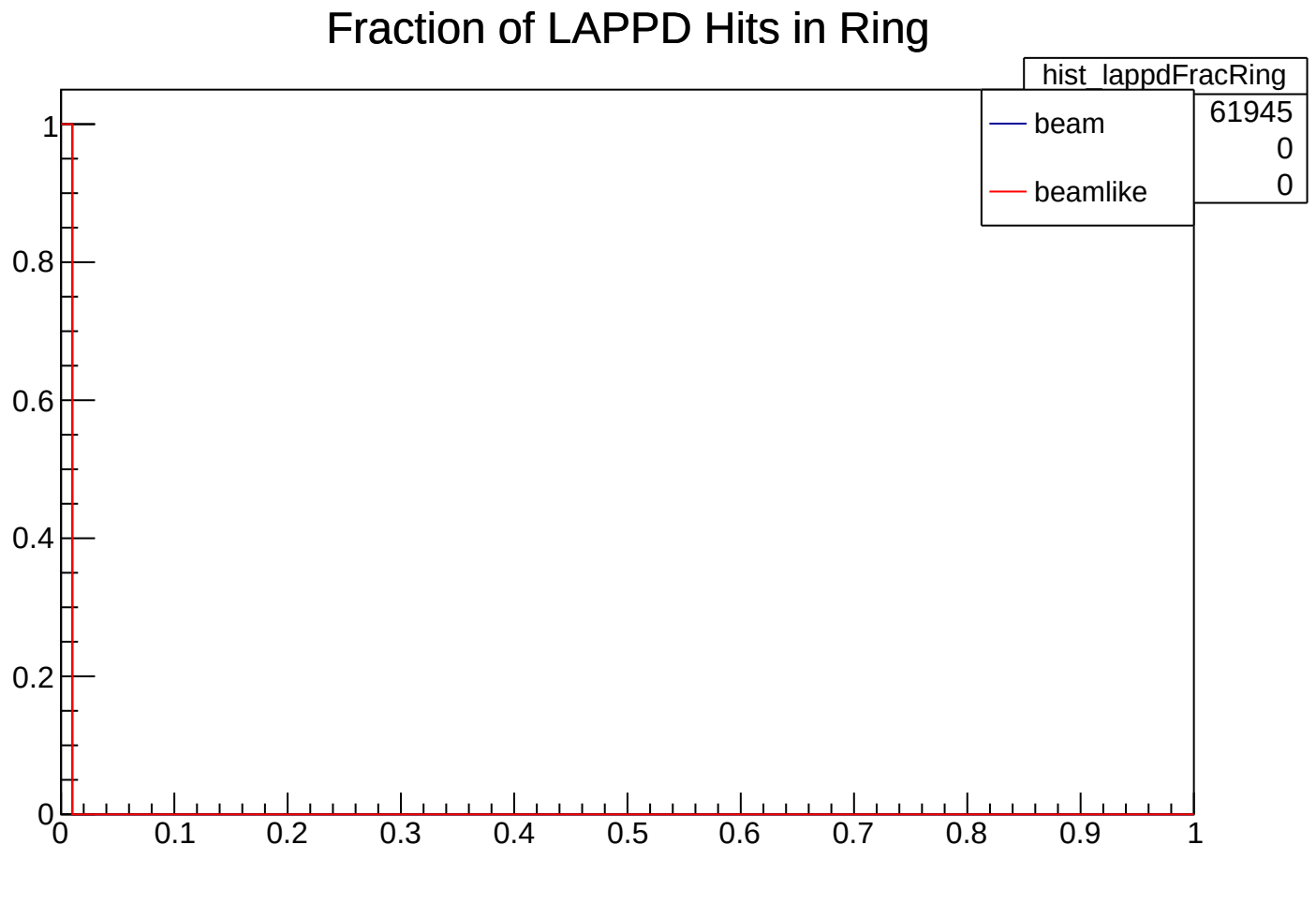

LAPPD Angular Kurtosis overview
hist_lappdAngleKurt
61945
-0.2804
0.2442
beam
beamlike
0.3
0.25
0.2
0.15
0.1
0.05
0
−2
0
2
4
6
8
10

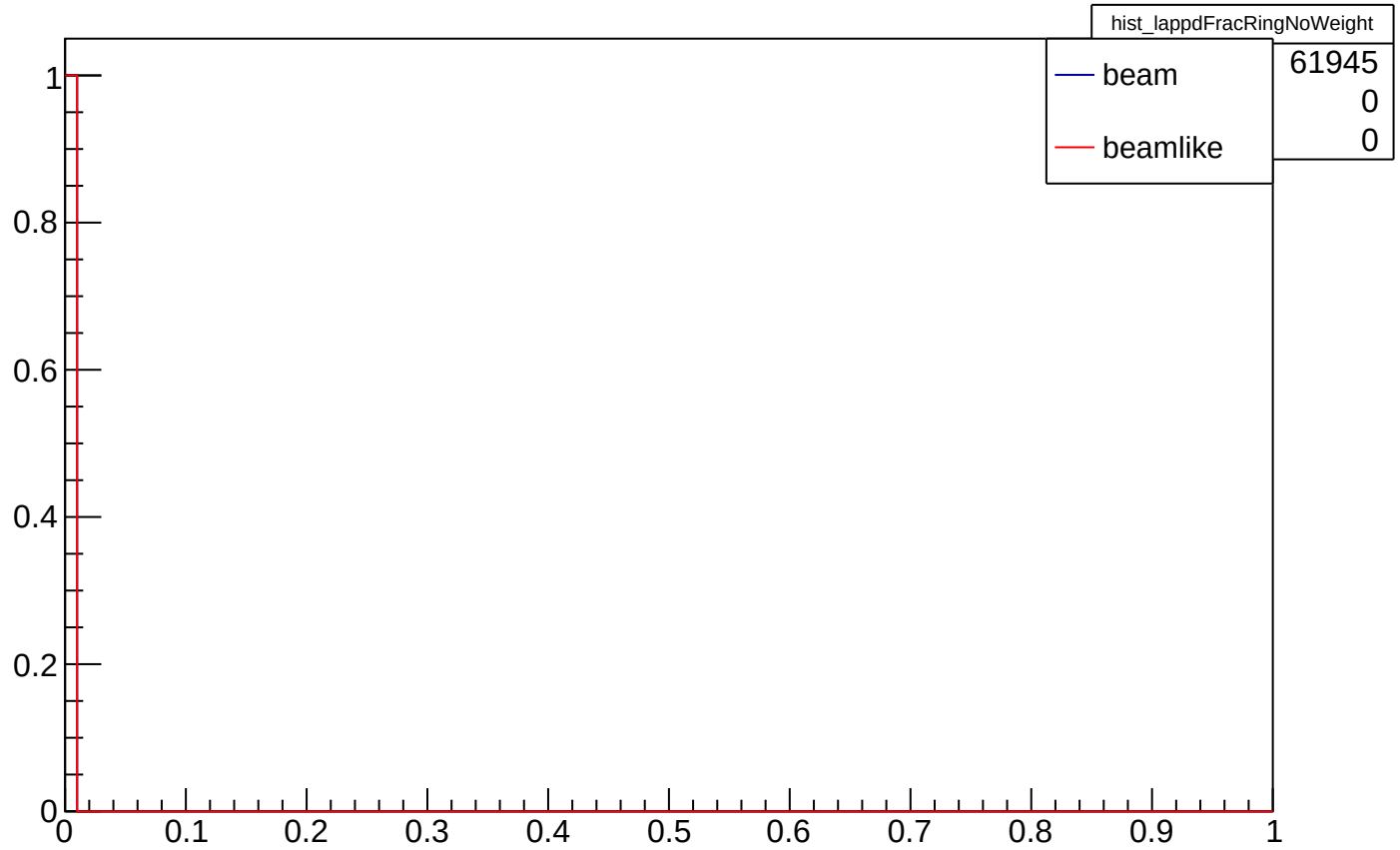

LAPPD Angular RMS (Barycenter) overview
hist_lappdBaryRMS
61945
0.2346
0.1498
beam
beamlike
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.5
1
1.5
2
2.5
3

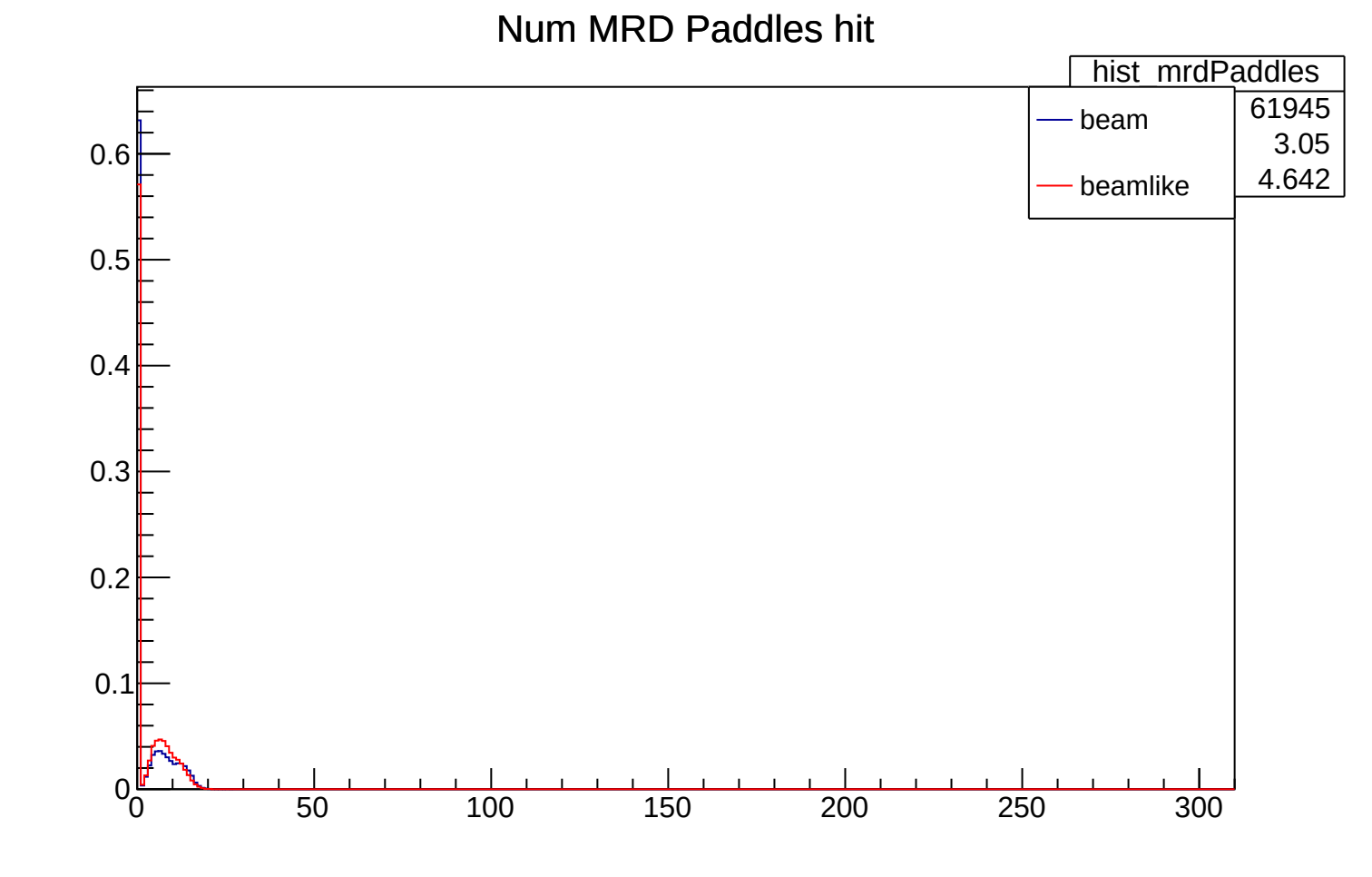

LAPPD Angular Variance (Barycenter) overview
hist_lappdBaryVar
61945
0.07746
0.07531
beam
beamlike
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.5
1
1.5
2
2.5
3

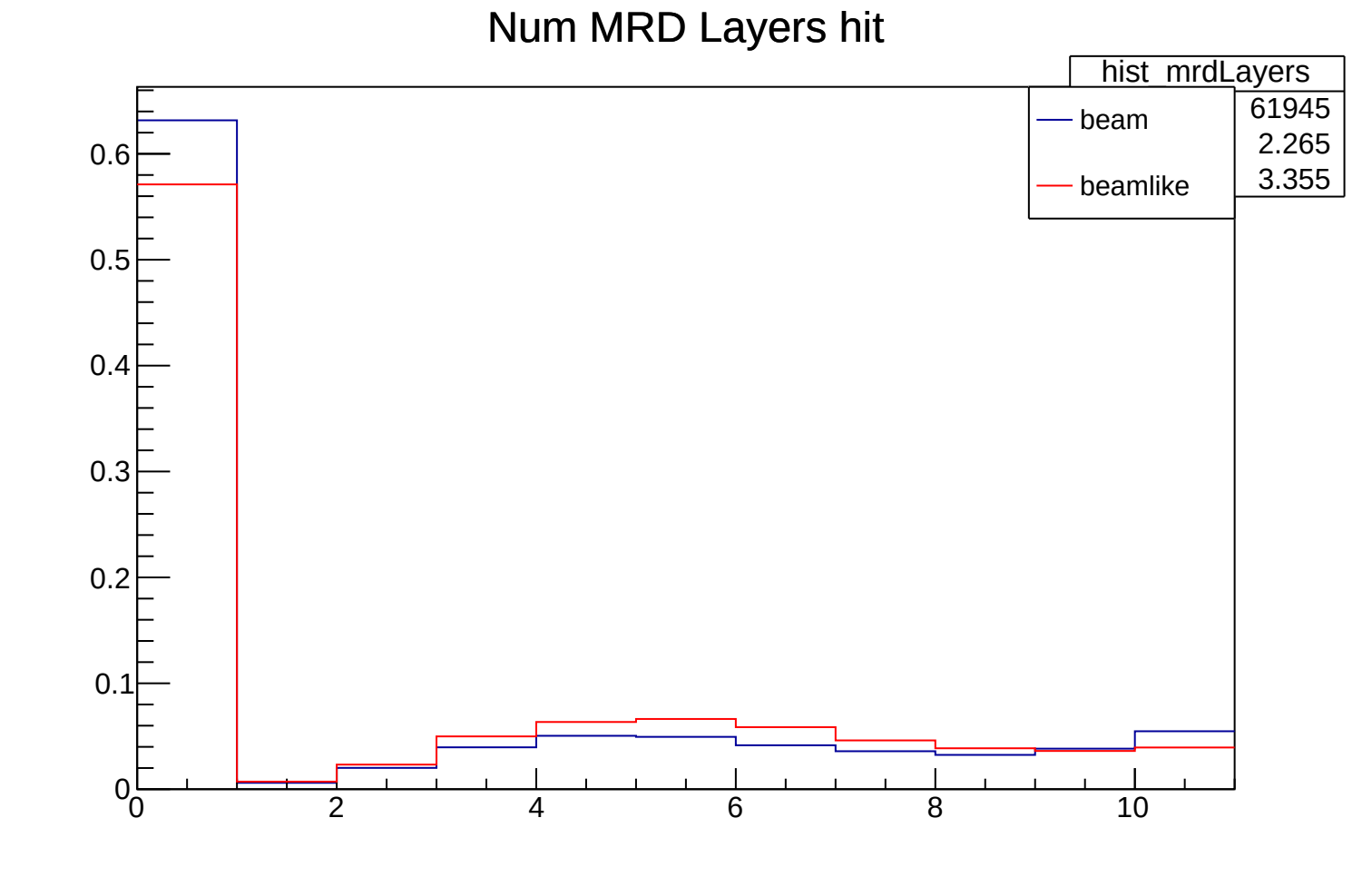

LAPPD Angular Skewness (Barycenter) overview
hist_lappdBarySkew
61945
0.02589
0.0502
beam
beamlike
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
−2
0
2
4
6
8
10

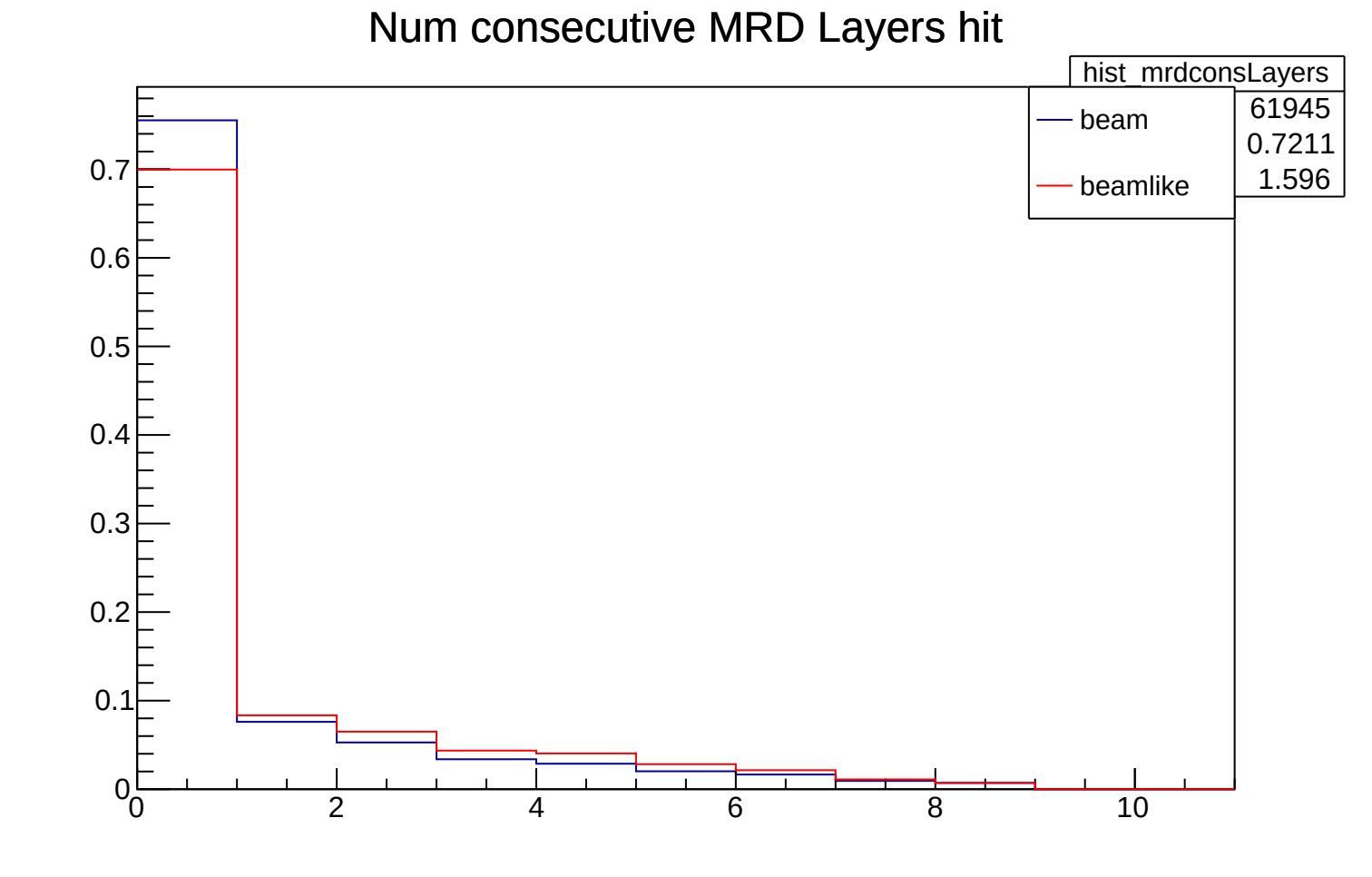

LAPPD Angular Kurtosis (Barycenter) overview
hist_lappdBaryKurt
61945
−0.0168
0.05142
beam
beamlike
1
0.8
0.6
0.4
0.2
0
−2
0
2
4
6
8
10

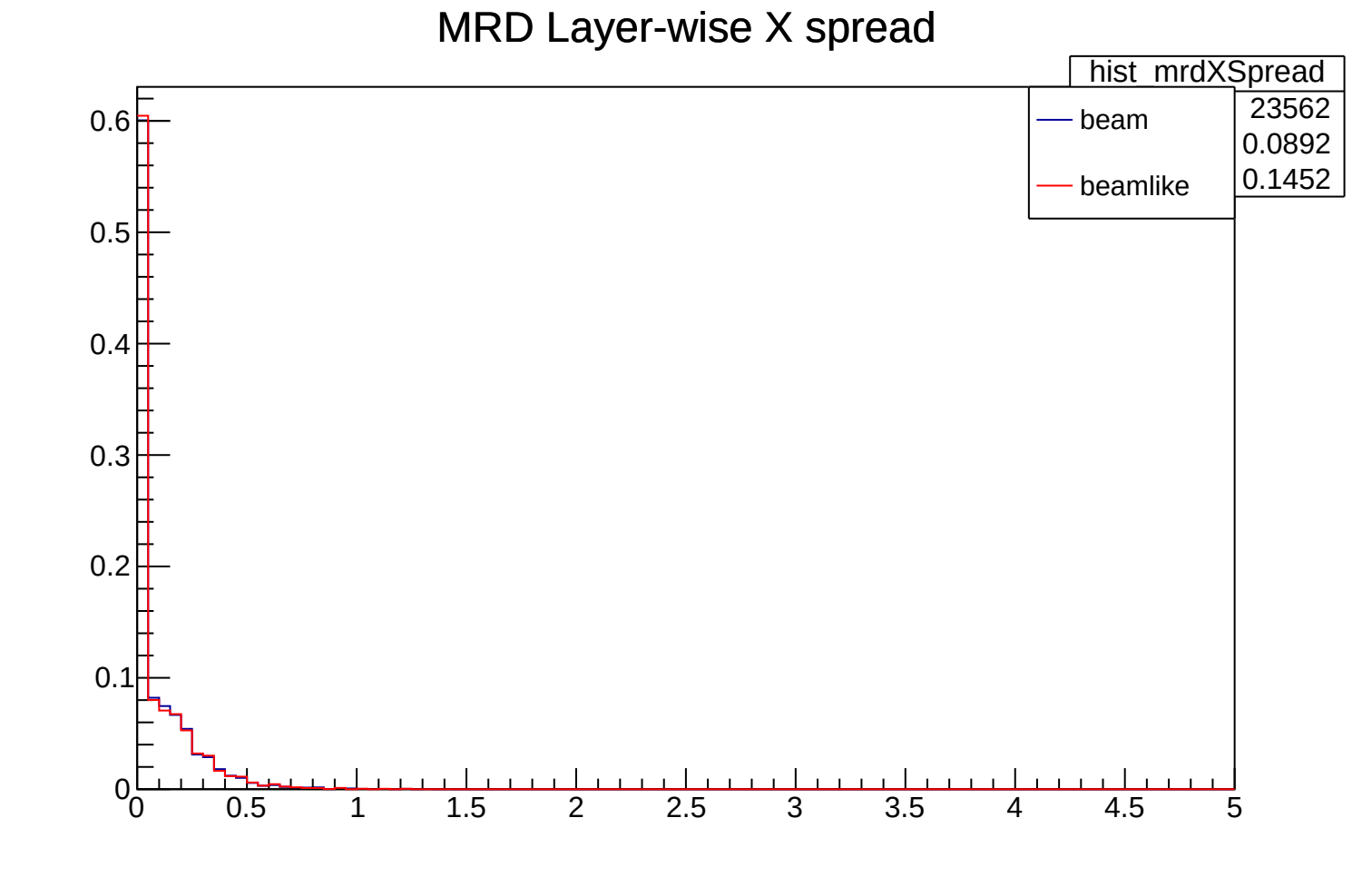

Fraction of LAPPD Hits in Ring
hist_lappdFracRing
61945
0
0
beam
beamlike
1
0.8
0.6
0.4
0.2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

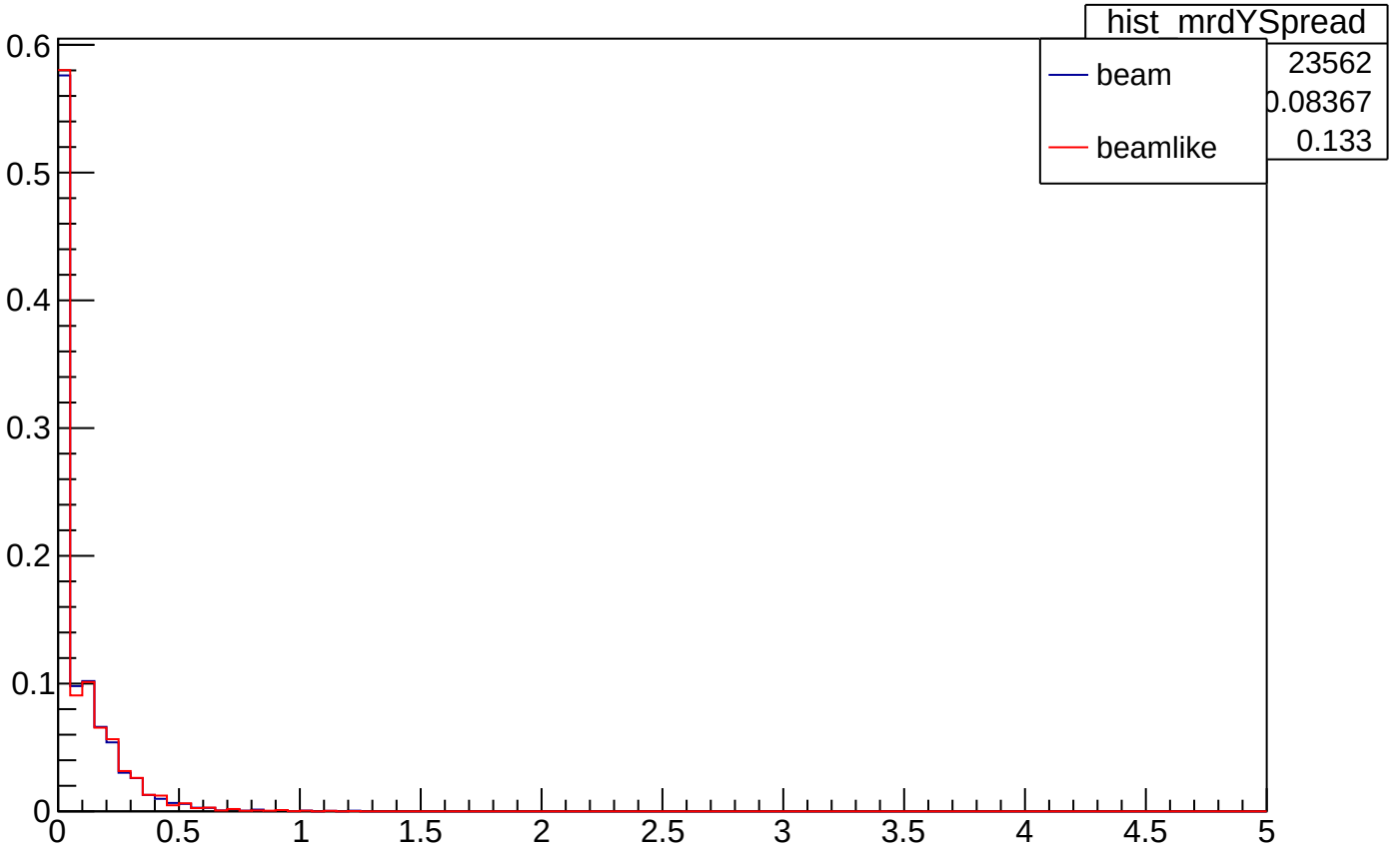

Fraction of LAPPD Hits in Ring
hist_lappdFracRingNoWeight
61945
0
0
beam
beamlike
1
0.8
0.6
0.4
0.2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

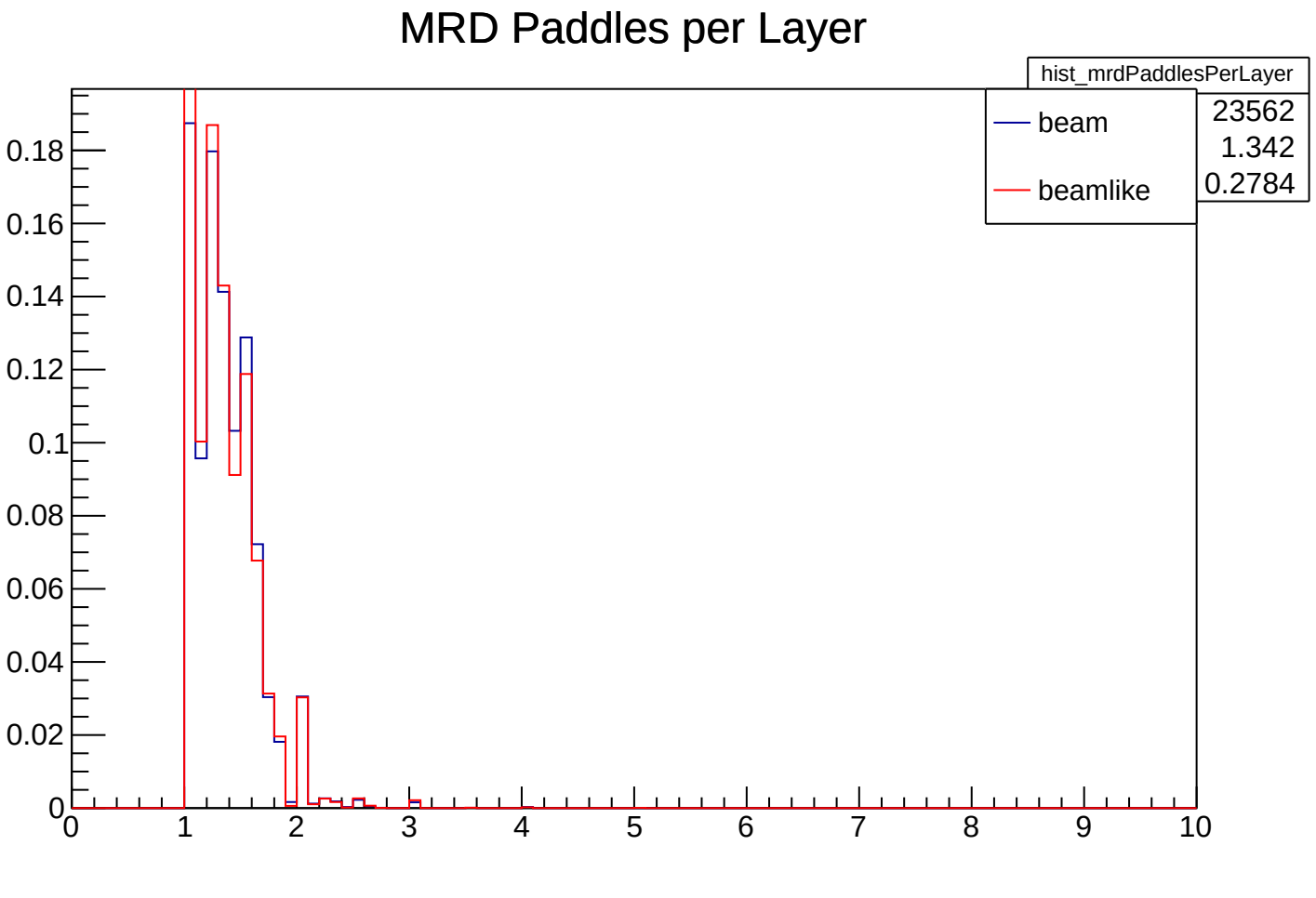

Num MRD Paddles hit
hist_mrdPaddles
61945
3.05
4.642
beam
beamlike
0.6
0.5
0.4
0.3
0.2
0.1
0
0
50
100
150
200
250
300

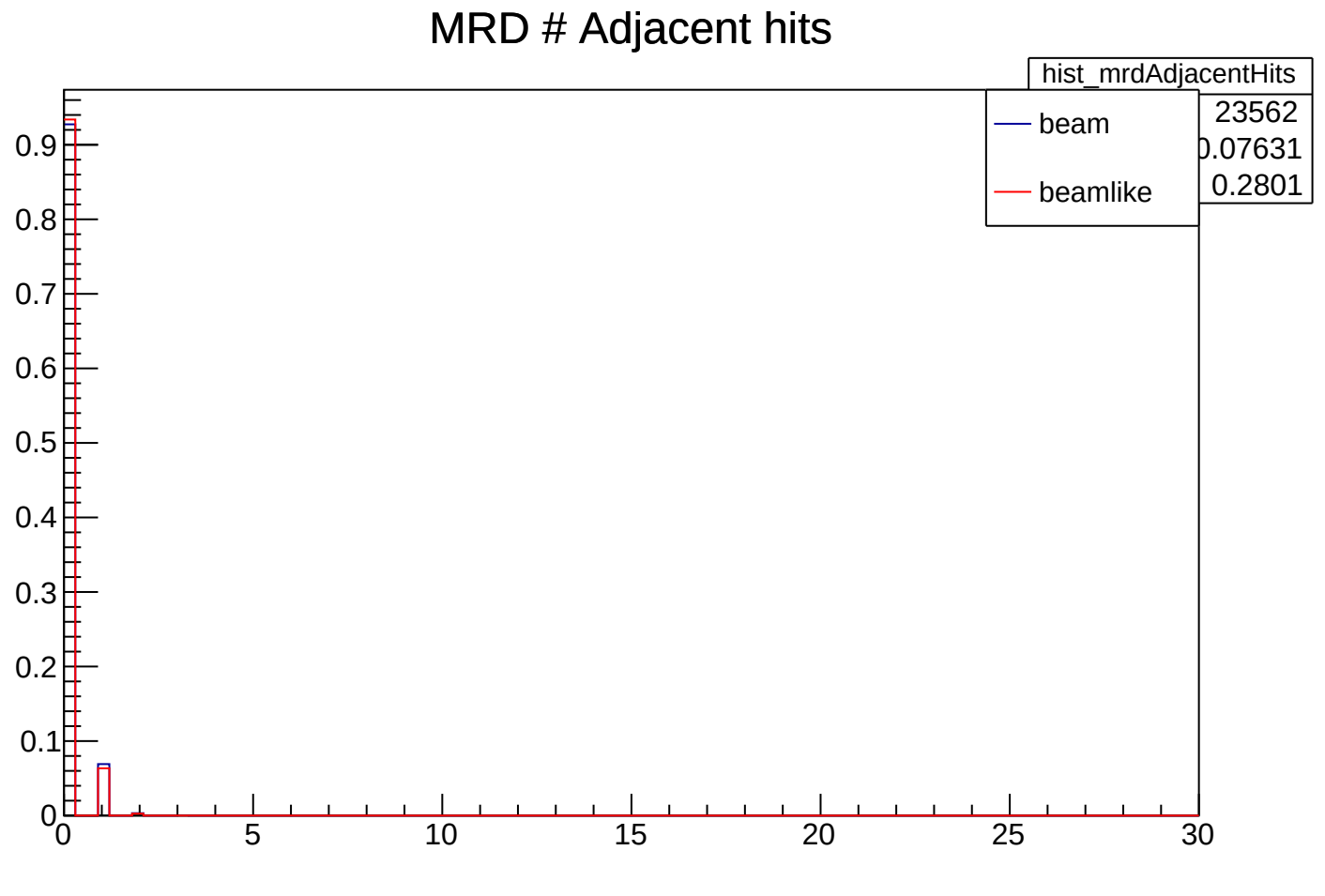

Num MRD Layers hit
hist_mrdLayers
61945
2.265
3.355
beam
beamlike
0.6
0.5
0.4
0.3
0.2
0.1
0
0
2
4
6
8
10

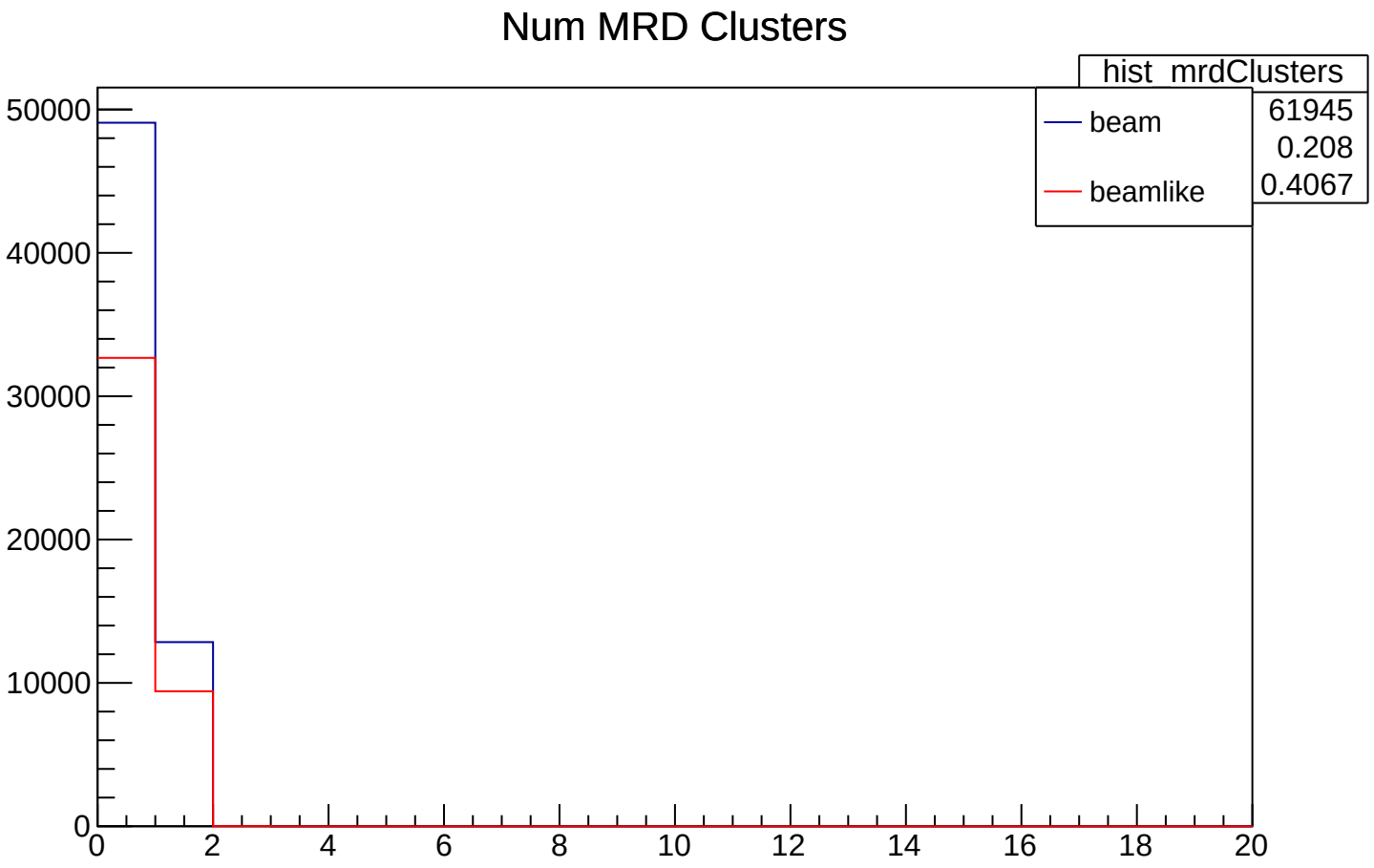

Num consecutive MRD Layers hit
hist_mrdconsLayers
61945
0.7211
1.596
beam
beamlike
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
2
4
6
8
10

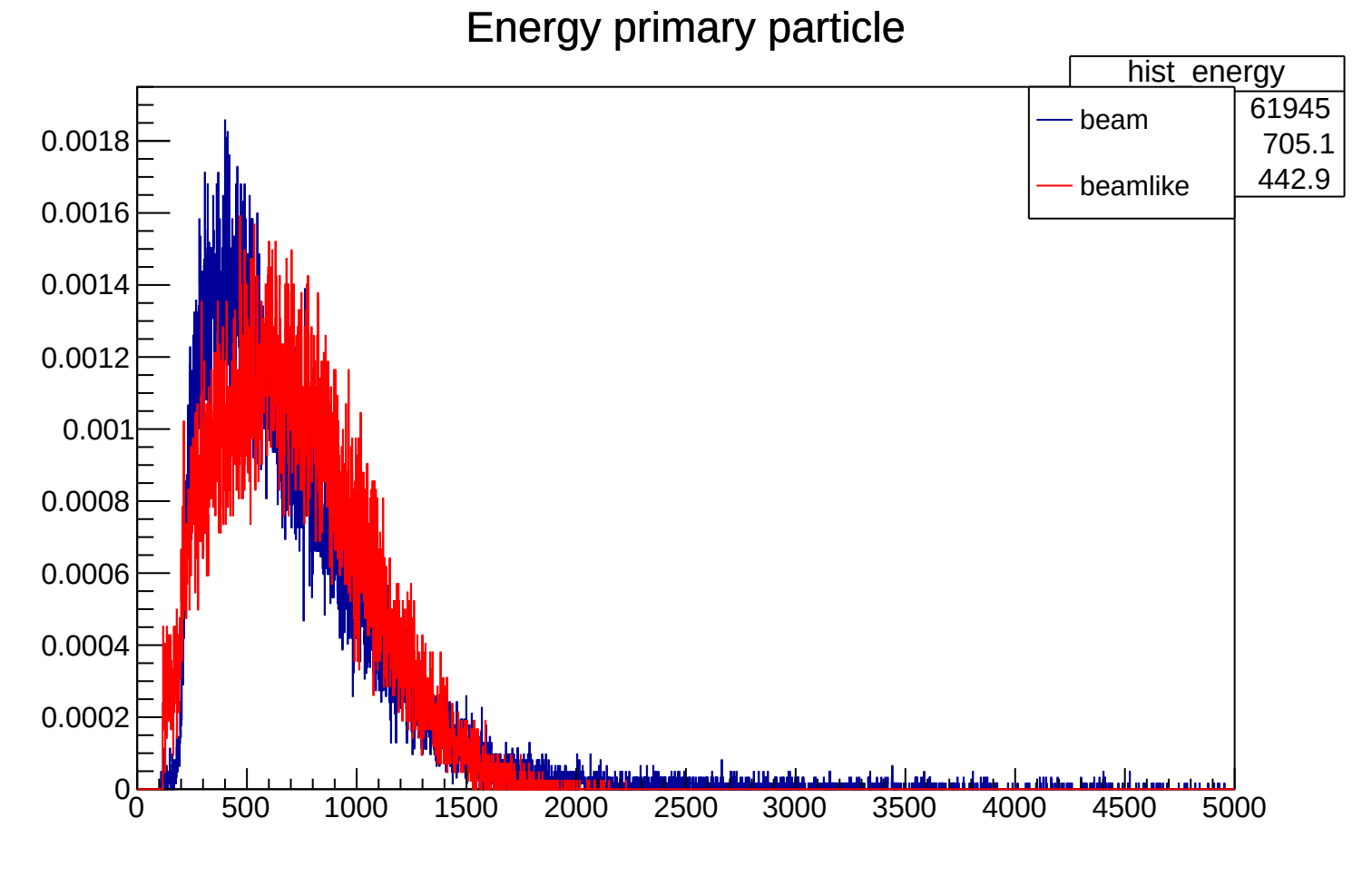

MRD Layer-wise X spread
hist mrdXSpread
23562
0.0892
0.1452
beam
beamlike
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

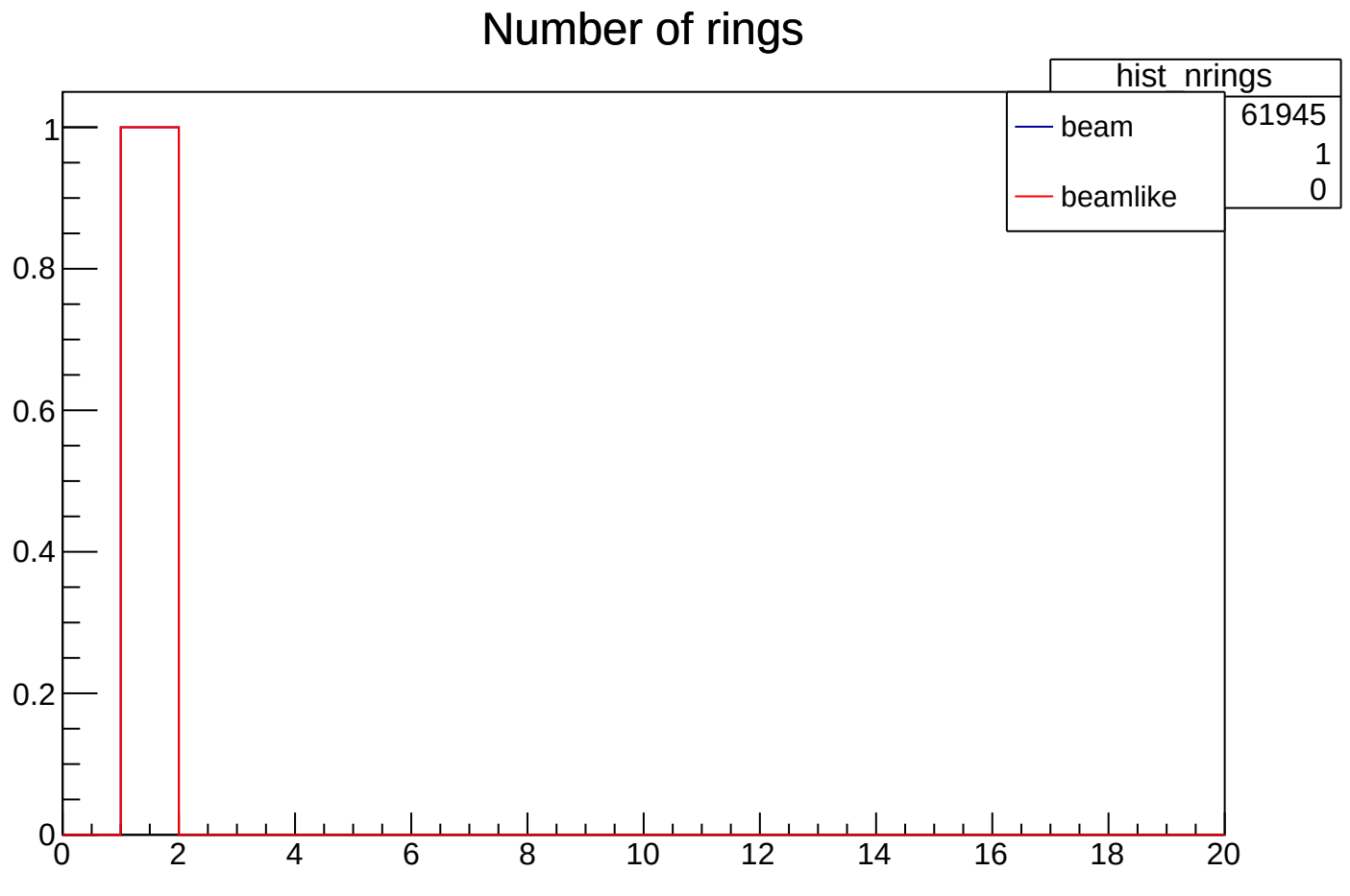

MRD Layer-wise Y spread
hist mrdYSpread
23562
0.08367
0.133
beam
beamlike
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

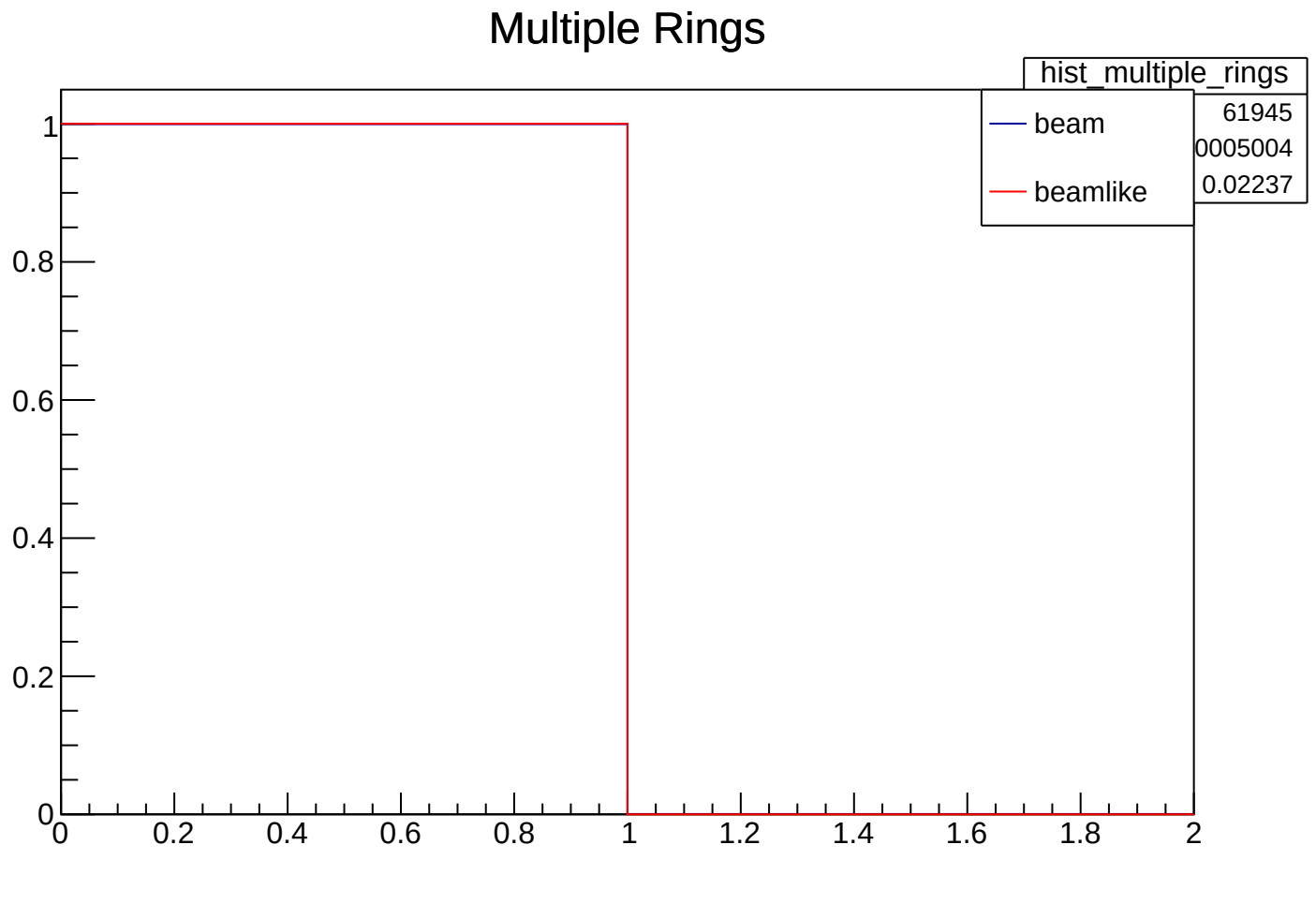

MRD Paddles per Layer
hist_mrdPaddlesPerLayer
beam
beamlike
23562
1.342
0.2784
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
1
2
3
4
5
6
7
8
9
10


MRD # Adjacent hits
hist_mrdAdjacentHits
beam
beamlike
23562
0.07631
0.2801
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
20
25
30


Num MRD Clusters
hist_mrdClusters
61945
0.208
0.4067
beam
beamlike
50000
40000
30000
20000
10000
0
0
2
4
6
8
10
12
14
16
18
20


Energy primary particle
hist_energy
61945
705.1
442.9
beam
beamlike
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000


Number of rings
hist_nrings
61945
1
0
beam
beamlike
1
0.8
0.6
0.4
0.2
0
0
2
4
6
8
10
12
14
16
18
20


Multiple Rings
hist_multiple_rings
beam
beamlike
61945
0005004
0.02237
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2